4K92-13

1990
KODIAK MANAGEMENT AREA
ANNUAL HERRING MANAGEMENT REPORT

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INTRODUCTION

Area Description

The Kodiak Management Area comprises the entire Kodiak archipelago and that portion of the Alaska Peninsula which drains into Shelikof Strait between Cape Douglas and Kilokak Rocks at Imuya Bay. The archipelago is approximately 200 miles long, extending from Shuyak Island south to the Trinity Islands. The Alaska Peninsula portion is about 300 miles long and is separated from the archipelago by the Shelikof Strait which averages 45 miles in width (Figure 1).

Historical Perspective

The Kodiak Area sac-roe fishery began in 1964 and has produced an average annual harvest of 1,390 tons over this 27 year period (Table 1). Prior to 1974 the fishery was essentially unregulated with regard to regulatory harvest quotas, gear types, seasons and fishing periods. Between 1974 and 1978 season dates ran from March 1 through June 30 with a harvest quota of 3,400 tons. Purse seine gear was initially restricted to a maximum length of 150 fathoms, a maximum depth of 1,000 meshes beginning in 1974. Annual harvests, along with effort levels, fish abundance, prices and processor interest, fluctuated greatly during the fourteen year period between 1964 and 1977. Following the low harvests during the mid-1970's came the pivotal years of 1977 and 1978. In 1977 improved market conditions kindled renewed industry interest. A few seiners began using spotter aircraft successfully in 1977. By 1978, the beginnings of the contemporary sac-roe fishery was evident with an expanded seine fleet using aircraft and tenders and gill net gear used in the fishery for the first time.

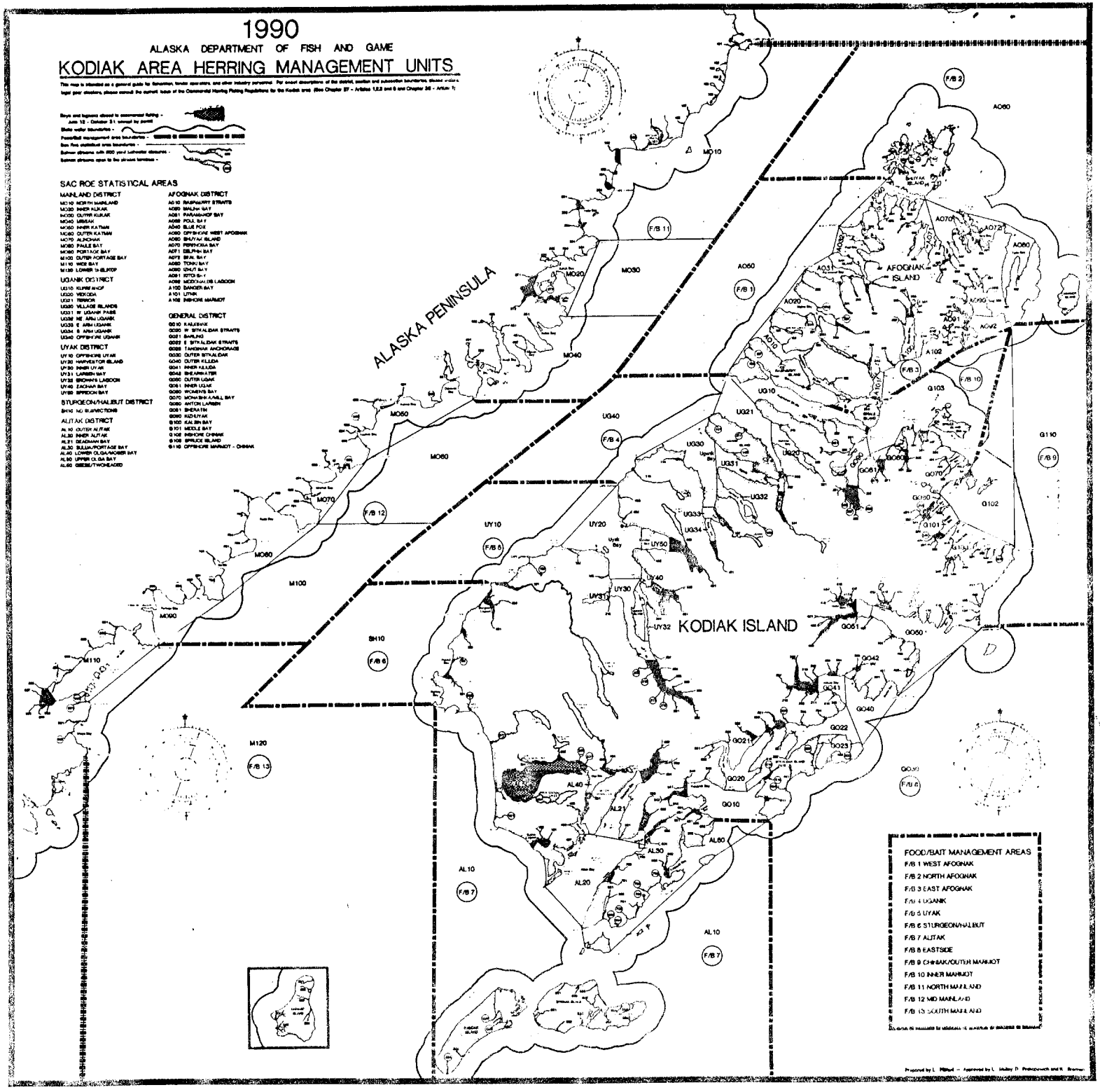

Figure 1. Kodiak Area herring management units, 1990.

Table 1. Historical harvest and effort level for the herring sac-roe fishery for the Kodiak Management Area, 1964-1990.

YEAR	TONS HARVESTED	SEINE	GILL NET	BUYER'S	NUMBER OF VESSELS TRAWLS	GILL NET	SEINE	TOTAL
1964	567.8	567.8	-	2	0	0	5	5
1965	657.2	657.2	-	2	0	0	8	8
1966	2,769.3	2,769.3	-	4	0	0	11	11
1967	1,662.4	1,662.4	-	4	0	0	5	5
1968	2,000.6	2,000.6	-	4	0	0	10	10
1969	1,130.0	1,130.0	-	9	0	0	21	21
1970	341.6	341.6	-	5	0	0	13	13
1971	284.3	284.3	-	2	0	0	4	4
1972	215.0	215.0	-	1	0	0	4	4
1973	831.0	831.0	-	4	0	0	11	11
1974	868.0	868.0	-	4	0	0	26	26
1975	8.0	8.0	-	3	0	0	2	2
1976	4.6	4.6	-	1	0	0	1	1
1977	338.4	338.4	-	3	0	0	11	11
1978	903.6	880.6	23.0	7	2	7	28	35
1979	1,735.1	1,457.2	277.9	8	0	125	57	182
1980	2,383.0	2,009.0	374.0	9	1	109	92	201
1981	2,065.4	1,596.2	469.2	9	0	114	79	193
1982	1,770.6	1,447.0	323.6	6	0	67	45	112
1983	2,318.5	1,796.9	521.6	7	0	64	41	105
1984	2,162.7	1,691.2	471.5	7	0	69	39	108
1985	1,967.7	1,244.2	723.5	7	0	81	34	115
1986	1,558.4	1,110.8	447.6	8	0	71	31	102
1987	2,145.9	1,591.3	554.6	8	0	62	29	91
1988	2,171.0	1,303.5	867.5	6	0	76	33	109
1989	2,248.6	1,512.6	736.0	6	0	83	37	120
1990	2,347.0	1,644.0	703.0	6	0	63	27	100
TOTALS	37,455.7	30,962.7	6,493.0					
AVERAGE	1,387.3	1,146.8	499.5					

Between 1977 and 1982, many regulatory changes and several changes in management strategy occurred as the fishery went through a rapid developmental phase. Regulatory changes focused on gear efficiency, gear conflicts between seiners and gill netters, restrictions on gear levels (exclusive registration and limited entry) and closed waters. In 1979 a 300 fathom maximum length limit was placed on gill net gear.

Also in 1979 the sac-roe season was reduced to run from May 1 to June 30 and the overall Guideline Harvest Level (GHL) was reduced to 2,400 tons distributed throughout the management area.

Beginning in 1980, the overall length of purse seines and gill nets were further reduced to 100 fathoms and 150 fathoms respectively. Trawl and beach seine gear were eliminated from "legal gear" status during the sac-roe fishery beginning in 1981. Also 1981 was the last "open to entry" fishery (prior to "limited entry") and the first year in which 24 hour fishing periods followed by 24 hour closures were established by emergency order.

Beginning in 1982, the season opening date was changed from May 1 to April 15. One of the last major regulation changes went into effect in 1984 when the fixed regulatory GHL of 2,400 tons was replaced by the current harvest strategy in which GHL's are set annually on a stock by stock basis.

The overall regulatory effect during the rapid developmental phase has been the emergence of a relatively stable commercial sac-roe fishery (Table 2).

METHODS

Fishery Characteristics and Harvest Strategy

The current Kodiak sac-roe fishery occurs in numerous bays and isolated coastal locations during a nine to ten week period

Table 2. Kodiak herring sac-roe fishery summary by year and by gear, 1979-1990.

YEAR	SEASON LENGTH (DAYS)	TOTAL HARVEST	BY GEAR		PERCENT		LANDINGS		NO. UNITS		AVG. $'S	
			SEINE	G/N	SEINE	G/N	SEINE	G/N	SEINE	G/N	SEINE	G/N
1979	36	1,735	1,457	278	84	16	-	-	57	125	38,347	3,333
1980	35	2,383	2,009	374	84	16	-	-	92	109	14,978	2,573
1981	48	2,065	1,596	469	77	23	207	406	79	114	14,402	3,471
1982	59	1,771	1,447	324	82	18	138	191	45	67	17,819	2,719
1983	51	2,319	1,797	522	78	22	164	284	41	64	35,061	6,520
1984	54	2,163	1,691	472	78	22	138	212	39	69	34,691	5,467
1985	59	1,968	1,244	724	63	37	118	348	34	81	32,935	8,039
1986	61	1,558	1,110	448	71	29	132	385	31	71	34,010	6,002
1987	61	2,146	1,591	554	74	26	122	411	29	62	54,872	8,945
1988	59	2,171	1,304	867	60	40	169	555	33	76	51,350	14,837
1989	76	2,249	1,513	736	67	33	171	627	37	83	34,749	7,537
1990	75	2,347	1,644	703	70	30	156	544	27	63	51,724	9,652
11 YEAR AVG.	56	2,073	1,534	539	74	26	151	396	45	82	34,578	6,591

extending from April 15 to late June. The fishery opens by regulation on April 15, and the entire management area is open at this time. Roe recovery and quality standards are determined by industry personnel. Fishing periods are set by emergency order and normally extend for 24 hours beginning at 12:00 noon on odd numbered days. The 24-hour closures, which begin at 12:00 noon on even numbered days, are a critical management tool which allows the management staff time to assess harvests, gear concentrations, herring biomass build-ups, and relocate field crews. Management units which are not closed in-season by emergency order close by regulation on June 30. Legal gear for this fishery is purse seines (100 fathoms maximum length and a maximum 1,025 meshes in depth), and gill nets (aggregate length may not exceed 150 fathoms).

Combined gear levels show a notable increase beginning in 1978 and increasing rapidly to highs of 201 units (92 seines and 109 gill nets) and 193 units (79 seines and 114 gill nets) in 1980 and 1981 respectively (Tables 1 and 2). With the implementation of limited entry following the 1981 sac-roe season, new entry into the fishery was restricted to past participants until permanent transferable permits could be awarded. Since 1982 gear levels have been relatively constant with 90 to 120 units of gear being fished annually. Transferrable permits for both gear types are still increasing as the Limited Entry Commission continues its determinations on participants who may qualify for a transferrable permit. Only 50% to 70% of the 174 available permits have been used annually since limited entry has been in place (Table 3).

The trend in overall harvest during the past 12 years has been relatively stable, averaging approximately 2,100 tons per year. Prior to 1978 the entire sac-roe harvest was taken by seine gear. Since 1979 the harvest percent taken by seine gear has ranged from a high of 84% in 1979 to a low of 60% in 1988 with 74% being the recent 12 year average. In 1978 seven units of gill net gear accounted for 3% of the harvest. In 1988, gill nets harvested 40% of the entire sac-roe harvest, with 26% being the recent 12 year

Table 3. Status of Kodiak sac-roe herring permits, 1987-1990.

	Year			
	1987	1988	1989	1990
Gill Net Transferable	59	63	64	72
Gill Net Non-transferable	48	41	41	31
Gill Net Total	107	104	105	103
Gill Net Fished	62	76	83	63
Seine Trasferable	40	45	45	46
Seine Non-transferable	26	24	24	25
Seine Total	66	69	69	71
Seine Fished	29	33	37	27
TOTALS				
Transferable	99	108	109	118
Non-transferable	74	65	65	56
Total	173	173	174	174
Fished	91	109	120	90

average. The increase in gill net efficiency can predominantly be associated with improved knowledge of specific stock timings, increased use of fish finding electronics and improvements in gear and vessels.

A unique characteristic of this fishery is that it commences prior to any major build-up of fish allowing for a more general distribution of effort and a slower rate of harvest on Kodiak's small stocks. Throughout the season, the entire fleet is allowed to roam independently in search of potential harvest locations. Both gill net and seine gear fish the same grounds, with no area or time separations by gear type. Monitoring of pre-harvest movements of both herring schools and commercial gear is critical to management activity. Even though the annual harvest is distributed between 40-50 management units (stocks) there is a general sequence of harvest timing by groups of these units. This allows ADF&G to distribute its on-the-ground monitoring effort into the most likely harvest locations. Frequent Alaska Department of Fish and Game (ADF&G) aerial surveillance of the entire area supplements, and often directs, in-season changes of fishery monitoring field crews. Commercial spotter reports provide invaluable information on all facets of the fishery and remain vitally important to management activities. An annual "Kodiak Sac-Roe Herring Harvest Strategy" is distributed which describes the current harvest strategy in detail (Appendix A.1).

This sac-roe fishery annually yields one of the higher ex-vessel dollar values per ton in the State. Competition among shore-based processors is probably a major factor combined with the high quality of fish. High quality fish are obtained from in-season handling of relatively small quantities over a long period of time and has provided Kodiak herring with a good reputation which yields maximum returns to the industry.

RESULTS

Effort and Harvest Summary

During a 75 day period extending from April 15 through June 28 a total of 2,347 short tons of sac-roe herring were harvested. The average roe recovery was approximately 10% and the average ex-vessel price (delivered to the dock) was $850 per ton for 10% recovery. The total estimated ex-vessel value of the fishery was $1,990,000.

Industry effort involved 27 seiners and 63 gill netters delivering to six different buyer/processors. Of the total 2,347 tons harvested, seiners harvested 1,644 tons (70%) from 156 landings and gill netters harvested 703 tons (30%) from 544 landings (Table 2).

The average earnings by gear type was $51,700 per seiner and $9,650 per gill netter. A further breakdown of the 1990 season by gear type by management unit is presented in Table 4.

The Fishery

Twenty eight emergency orders (E.O.'s) were issued to regulate the 1990 sac-roe fishery. The first one initiated the weekly fishing periods and opening/closing times for each period. The remaining E.O.'s were used to close specific management units as pre-season G.H.L.'s were achieved or in-season fishery performance indicated weaker than anticipated stock performance (Table 5).

There are 74 management units currently described for the Kodiak Management Area, of which nine units are located in offshore areas and are not anticipated to produce a roe harvest. Sixty (60) of the remaining 65 management units have been exploited during the development of Kodiak's sac-roe fishery.

Table 4. Herring sac roe fishery harvest summary by gear/area for the Kodiak Management Area, 1990.

STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	SEINE	%	GILLNET	%	TOTAL	DATE CLOSED
AFOGNAK DISTRICT								
A010	**Raspberry Sts.**	**55 TONS**	12.8	31	29.1	69	41.6	4/28
A020	**Malina Bay**	**30 TONS**	37.6	100	0	0	37.6	4/19
A031	**Paramanof Bay**	**40 TONS**	18.6	44	23.3	56	41.9	4/24
A032	**Foul Bay**	**20 TONS**	8.8	41	12.5	59	21.3	4/28
A040	**Devils Inlet**	**10 TONS**	0	-	0	-	0	6/30
A040	**Blue Fox**	**10 TONS**	0	-	0	-	0	6/30
A050	**Offshore W. Afog.**[a]	**-**	0	-	0	-	0	6/30
A060	**Shuyak Is.**	**20 TONS**	0	-	0	-	0	6/30
A070	**Perenosa Bay**	**15 TONS**	27.5	94	1.8	6	29.3	5/06
A071	**Delphin Bay**	**10 TONS**	0	-	0	-	0	6/30
A072	**Seal Bay**	**10 TONS**	0	-	0	-	0	6/30
A080	**Tonki Bay**	**15 TONS**	5.2	72	2.0	28	7.2	6/30
A090	**Izhut Bay**	**25 TONS**	20.5	70	8.7	30	29.2	4/25
A091	**Kitoi Bay**	**15 TONS**	0	-	8.9	100	8.9	6/30
A092	**MacDonalds Lagoon**	**10 TONS**	0	-	0.2	100	0.2	6/30
A100	**Danger Bay**	**30 TONS**	0	-	5.3	100	5.3	5/16
A101	**Litnik**	**10 TONS**	0	-	3.4	100	3.4	6/30
A102	**Duck Bay**	**10 TONS**	0	-	0	-	0	6/30
District Totals	**17**	**335 TONS**	**131.0**	**58**	**95.2**	**42**	**226.2**	

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STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	SEINE	%GILLNET	%	TOTAL	DATE CLOSED
UYAK DISTRICT							
UY10	**Offshore Uyak**[a]	-	0	-	0	-	0	6/30
UY20	**Harvester Island**	**10 TONS**	0	-	0	-	0	6/30
UY30	**Inner Uyak**	**240 TONS**	183.9	76	59.0	24	242.9	6/01
UY31	**Larsen Bay**	**10 TONS**	0	-	7.2	100	7.2	6/30
UY32	**Browns Lagoon**	**20 TONS**	14.0	62	8.5	38	22.5	5/21
UY40	**Zachar Bay**	**100 TONS**	22.1	23	73.4	77	95.5	5/28
UY50	**Spiridon Bay**	**160 TONS**	114.2	64	63.2	36	177.4	5/19
District Totals	**6**	**540 TONS**	**334.2**	**61**	**211.3**	**39**	**545.5**	
UGANIK DISTRICT							
UG10	**Kupreanof**	**10 TONS**	0	-	0	-	0	6/30
UG20	**Viekoda**	**20 TONS**	15.2	55	12.5	45	27.7	5/24
UG21	**Terror**	**60 TONS**	6.4	43	8.4	57	14.8	6/30
UG21	**Uganik Is. Lagoon**[b]	**0 TONS**	0	-	0	-	0	6/30
UG30	**Village Island**	**25 TONS**	58.3	100	0	-	58.3	4/27
UG31	**W. Uganik Pass**	**15 TONS**	22.3	100	0	-	22.3	4/29
UG32	**NE Arm Uganik**	**75 TONS**	37.7	81	86	19	46.3	6/30
UG33	**E. Arm Uganik**	**30 TONS**	0	-	41.2	100	41.2	5/11
UG34	**S. Arm Uganik**	**30 TONS**	44.4	86	7.4	14	51.8	6/22
UG40	**Offshore Uganik**[a]	-	0	-	0	-	0	6/30
District Totals	**9**	**265 TONS**	**184.3**	**70**	**78.1**	**30**	**262.4**	

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STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	SEINE	%	GILLNET	%	TOTAL	DATE CLOSED
ALITAK DISTRICT								
AL10	**Outer Alitak**	**(Exploration)**	0	-	0	-	0	6/30
AL20	**Inner Alitak**	**(Exploration)**	0	-	0	-	0	6/30
AL21	**Deadman Bay**	**125 TONS**	143.5	100	0	-	143.5	5/14
AL30	**Sulua/Portage Bay**	**60 TONS**	62.0	76	19.3	24	81.3	5/21
AL40	**Lower Olga/Moser**	**15 TONS**	0	-	0	-	0	6/14
AL40	**N. Upper Olga B.**	**10 TONS**	0	-	0	-	0	6/14
AL50	**Upper Olga Bay**	**190 TONS**	161.2	87	23.2	13	184.4	6/14
AL60	**Geese/Twoheaded**	**(Exploration)**	0	-	0	-	0	6/30
District Totals:	**8**	**400 TONS**	**366.7**	**90**	**42.5**	**10**	**409.2**	
STURGEON/HALIBUT DISTRICT								
SH10	**Sturgeon/Halibut**	**(Exploration)**	0	-	0	-	0	-
GENERAL DISTRICT								
GO10	**Kaiugnak**	**10 TONS**	0	-	0	-	0	6/30
GO20	**W. Sitkalidak St.**	**50 TONS**	27.2	49	28.7	51	55.9	5/02
GO21	**Barling**	**20 TONS**	6.5	28	16.7	72	23.2	4/18
GO22	**E. Sitkalidak St.**	**95 TONS**	98.3	78	28.4	22	126.7	4/27
GO23	**Tanginak Anchorage**	**15 TONS**	28.1	100	0	-	28.1	5/08
GO30	**Outer Sitkalidak**	**(Exploration)**	0	-	0	-	0	6/30
GO40	**Outer Kiliuda**	**(Exploration)**	22.3	100	0	-	22.3	6/30

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Table 4. (page 4 of 5)

STAT. AREA	MGMT. UNITS	1990 GUIDELINEHRSE HARVEST LEVESEINE		%GILLNET	%	TOTAL	DATE CLOSED
GENERAL DISTRICT (continued)							
G041	**Inner Kiliuda**	**10 TONS**	8.1	100	0	-	8.1	5/02
G042	**Shearwater**	**25 TONS**	89.4	97	2.6	3	92.0	5/21
G050	**Pasagshak**	**25 TONS**	68.6	100	0	-	68.6	5/21
G050	**Outer Ugak**	**(Exploration)**	0	-	0	-	0	6/30
G051	**Inner Ugak**	**50 TONS**	92.8	91	9.1	9	101.9	5/20
G060	**Womens Bay**	**110 TONS**	20.4	27	54.4	73	74.8	6/30
G070	**Monashka/Mill B.**	**(Exploration)**	0	-	0	-	0	6/30
G080	**Anton Larsen**	**20 TONS**	0	-	7.4	100	7.4	6/30
G081	**Sheratin**	**10 TONS**	0	-	1.3	100	1.3	6/30
G090	**Kizhuyak**	**110 TONS**	22.2	22	79.5	78	101.7	5/16
G100	**Kalsin Bay**	**15 TONS**	11.8	100	0	-	11.8	6/06
G101	**Middle Bay**	**20 TONS**	16.1	100	0	-	16.1	5/16
G102	**Inshore Chiniak**	**10 TONS**	0	-	0	-	0	6/30
G103	**Spruce Island**	**10 TONS**	0	-	0	-	0	6/30
District Total	**21**	**605 TONS**	**511.8**	**69**	**228.1**	**31**	**739.9**	
MAINLAND DISTRICT							
M010	**North Mainland**	**(Exploration)**	0	-	0	-	0	6/30
M020	**Inner Kukak**	**50 TONS**	27.9	37	47.6	63	75.5	5/10
M030	**Outer Kukak**[a]	-	0	-	0	-	0	6/30
M040	**Inner Missak**	**(Exploration)**	0	-	0	-	0	6/30
M040	**Outer Missak**[a]	-	0	-	0	-	0	6/30

-Continued-

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STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	SEINE	%	GILLNET	%	TOTAL	DATE CLOSED
MAINLAND DISTRICT (continued)								
M050	**Inner Katmai**	**50 TONS**	0	-	0	-	0	6/30
M060	**Outer Katmai**[a]	-	0	-	0	-	0	6/30
M070	**Alinchak**	**30 TONS**	41.2	100	0	-	41.2	5/14
M080	**Puale Bay**	**(Exploration)**	0	-	0	-	0	6/30
M090	**Portage Bay**	**(Exploration)**	0	-	0	-	0	6/30
M100	**Outer Portage**[a]	-	0	-	0	-	0	6/30
M110	**Wide Bay**	**100 TONS**	47.1	100	0	-	47.1	6/30
M120	**Lower Shelikof**	**(Exploration)**	0	-	0	-	0	6/30
District Total		**230 TONS**	**116.2**	**71**	**47.6**	**29**	**163.8**	
GRAND TOTAL		**2,375 TONS**	**1,644.2**	**70**	**702.8**	**30**	**2,347.0**	

[a] These are offshore management units which are not expected to yield herring of sac-roe quality. These units are more applicable to the food/bait fishery. (See Herring Food/Bait Fishery Management Plan.)

[b] The spawning biomass has probably been reduced to less than 50 tons and the unit is closed to fishing.

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Table 5. Summary of emergency order abstracts issued for the herring fisheries in the Kodiak Management Area, 1990.

Emergency Order No. 4-F-K-01-90

Effective Date: 12:00 Noon April 15, 1990

EXPLANATION:

This emergency order establishes fishing periods for the 1990 Kodiak Area commercial herring sac-roe fishery, describes the initial fishing period, and clarifies waters closed to commercial herring fishing.

The fishery will open for 24 hour fishing periods, each of which begins at 12:00 Noon on the odd numbered days of the month and closes at 12:00 Noon on the even numbered days of the month. Each 24 hour opening will be separated by a 24 hour closure in the entire management area except for the following areas which will remain closed to commercial herring fishing until further notice:

(1) Brown's Lagoon

(2) Women's Bay inside of a line from Shannon's Point to the southern tip of Nyman Peninsula

(3) All lagoons on Uganik Island

The only exception to this "24 hour on - 24 hour off" rule is the period from 12:00 Noon May 31 through 12:00 Noon June 2 when the fishery shall actually be open for a 48 hour period due to the occurrence of two consecutive odd numbered days.

JUSTIFICATION:

Regulations adopted by the Board of Fisheries established that fishing periods for the commercial sac-roe fishery in the Kodiak Area would be announced by Emergency Order. During the sac-roe season April 15 through June 30, the small herring stocks of the Kodiak Area are concentrated and so vulnerable to over exploitation. The 24 hour opening separated by 24 hour closures will reduce the time that individual stocks are subject to exploitation and will assist the Department by allowing time to collect harvest information and assess the situations in the various management units.

This Emergency Order is necessary to establish the initial and in-season fishing periods for the commercial herring sac-roe fishery and to clarify which waters are closed to commercial herring fishing for the entire season.

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Emergency Order No. 4-F-K-02-90

Effective Date: 12:00 Noon April 18, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Barling Bay Subsection (GO21) effective at 12:00 Noon Wednesday April 18, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Herring Strategy (R.I.R. #4-K-90-11) states that the guideline harvest for the Barling Bay Subsection of the General District (GO21) is 20 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently a closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-03-90

Effective Date: 7:30 P.M. April 19, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Malina Bay section (A020) effective at 7:30 P.M. Thursday April 19, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest for the Malina Bay Section of the Afognak District (A020) is 30 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently a closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-04-90

Effective Date: 12:00 Noon April 24, 2990

EXPLANATION:

This emergency order closes to commercial herring fishing the Paramanof Bay Subsection (A031) effective at 12:00 Noon Tuesday April 24, 1990 until further notice.

-Continued-

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest for the Paramanof Bay Section of the Afognak District (A031) is 40 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently a closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-05-90

Effective Date: 5:20 P.M. April 25, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Izhut Bay Section (A090) effective at 5:20 P.M. Wednesday April 25, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest for the Izhut Bay Section of the Afognak District (A090) is 25 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently a closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-06-90

Effective Date: 5:10 P.M. April 25, 1990

EXPLANATION:

This emergency order closes the following management units to commercial herring fishing until further notice:

- The East Sitkalidak Subsection (G022) effective at 5:10 P.M. Friday April 27, 1990.
- The Village Islands Subsection (UG30) effective at 9:30 P.M. Friday April 27, 1990.
- The Foul Bay Subsection (A032) effective at 8:30 A.M. Saturday April 28, 1990.

-Continued-

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Sitkalidak Subsection (G022) is 95 tons, of the Village Islands Subsection (UG30) is 25 tons, and of the Foul Bay Subsection (A032) is 20 tons. Preliminary catch information indicates the catch in each of these management units is at or over the guideline harvest level. Consequently a closure of each of these management units is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-07-90

Effective Date: 12:00 Noon April 28, 1990

EXPLANATION:

This emergency order closes to commercial fishing the Raspberry Straits Section (A010) effective at 12:00 Noon Saturday April 30, 1990, until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Raspberry Straits Section (A010) is 55 tons. However, preliminary information indicates that the initial harvests have contained a large number of small recruit herring (3 year olds). The roe recovery has been low, and several loads have been refused by industry technicians because of that and the small average size of the herring. Consequently a closure of this management unit is warranted to prevent wastage of these young herring.

Emergency Order No. 4-F-K-08-90

Effective Date: 3:30 P.M. April 29, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the West Uganik Pass Subsection (UG31) effective at 3:30 P.M. Sunday April 29, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Herring Strategy (R.I.R. #4-K-90-11) states that the guideline harvest for the West Uganik Pass

-Continued-

Subsection (UG31) is 15 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently a closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-09-90

Effective Date: 12:00 Noon May 2, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the West Sitkalidak Subsection (GO20) and the Inner Kiliuda Subsection (GO41) effective at 12:00 Noon Wednesday May 2, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the West Sitkalidak Subsection (GO20) is 50 tons, and for the Inner Kiliuda Subsection (GO41) is 10 tons. Preliminary catch information indicates the catch in these management units is at or over the guideline harvest level. Consequently closure of each of these management units is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-10-90

Effective Date: 12:00 Noon May 6, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Perenosa Bay Subsection (AO70) effective at 12:00 Noon Sunday May 6, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Perenosa Bay Subsection (AO70) is 15 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

-Continued-

Table 5. (page 6 of 16)

Emergency Order No. 4-F-K-11-90

Effective Date: 12:00 Noon May 8, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Tanginak Anchorage Subsection (GO23) effective at 12:00 Noon Tuesday May 8, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Tanginak Anchorage Subsection (GO23) is 15 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-12-90

Effective Date: 12:00 Noon May 10, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Inner Kukak Section (MO20) effective at 12:00 Noon Thursday May 10, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Inner Kukak Section (MO20) is 50 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-13-90

Effective Date: 9:30 P.M. May 11, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the East Arm Uganik Subsection (UG33) effective at 9:30 P.M. Friday May 11, 1990 until further notice.

-Continued-

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the East Arm Uganik Subsection (UG33) is 30 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-14-90

Effective Date: 12:00 Noon May 14, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Deadman Bay Subsection (AL21) effective at 12:00 Noon Monday May 14, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Deadman Bay Subsection (AL21) is 125 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-15-90

Effective Date: 12:00 Noon May 14, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Alinchak Section (MO70) effective at 12:00 Noon Monday May 14, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Alinchak Section (MO70) is 30 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

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Emergency Order No. 4-F-K-16-90

Effective Date: 8:30 A.M. May 16, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Middle Bay Subsection (G101) effective at 8:30 A.M. Wednesday May 16, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Middle Bay Subsection (G101) is 20 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-17-90

Effective Date: 12:00 Noon May 16, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Danger Bay Subsection (A100) and the Kizhuyak Bay Section (G090) effective at 12:00 Noon Wednesday May 16, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that for each stock emergency order closures may occur when guideline harvest levels are achieved or when fishery performance and stock performance (i.e. recruitment) indicate that deviations from the guideline harvest level are warranted. Preliminary information from ADF&G field personnel, commercial fishermen, and spotters indicates that the latter case occurring in the Danger Bay Subsection (A100). Harvest rates and population estimates are the lowest on record for this date. Consequently closure of the entire management unit is warranted to prevent over exploitation of a depressed stock.

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Kizhuyak Bay Section (G090) is 110 tons. Preliminary catch information

-Continued-

indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-18-90

Effective Date: 2:00 P.M. May 19, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Spiridon Bay Section (UY50) effective at 2:00 P.M. Saturday May 19, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Spiridon Bay Section (UY50) is 160 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-19-90

Effective Date: 12:00 Noon May 20, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Inner Ugak Subsection (G051) effective at 12:00 Noon Sunday May 20, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Inner Ugak Subsection (G051) is 50 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

-Continued-

Table 5. (page 10 of 16)

Emergency Order No. 4-F-K-20-90

Effective Date: 3:40 P.M. May 21, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Sulua-Portage Section (AL30) and the Shearwater Subsection (G042) effective at 3:40 P.M. Monday May 21, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Sulua-Portage Section (AL30) is 60 tons and for the Shearwater Subsection (G042) is 25 tons. Preliminary catch information indicates the catch in these management units is at or over the guideline harvest level. Consequently closure of both management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-21-90

Effective Date: 3:40 P.M. May 21, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing that portion of the Outer Ugak Subsection (G050) in Pasagshak Bay north of 57°26'06" N. lat. effective at 3:40 P.M. Monday May 21, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest levels for the Pasagshak Bay portion of the Outer Ugak Subsection (G050) is 25 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of this portion of the management unit is warranted to prevent over exploitation.

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Emergency Order No. 4-F-K-22-90

Effective Date: 6:00 P.M. May 21, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Brown's Lagoon Subsection (UY32) effective at 6:00 P.M. Monday May 21, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Brown's Lagoon Subsection (UY32) is 20 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-23-90

Effective Date: 9:00 A.M. May 24, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Viekoda Bay Subsection (UG20) effective at 9:00 P.M. Thursday May 24, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Viekoda Bay Subsection (UG20) is 20 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-24-90

Effective Date: 12:00 Noon May 28, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Zachar Bay Subsection (UY40) effective at 12:00 Noon Monday May 28, 1990 until further notice.

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JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Zachar Bay Subsection (UY40) is 100 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-25-90

Effective Date: 8:00 A.M. June 1, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Inner Uyak Bay Section (UY30) effective at 8:00 A.M. Friday June 1, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Inner Uyak Bay Section (UY30) is 240 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-26-90

Effective Date: 12:00 Noon June 6, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Kalsin Bay Subsection (G100) effective at 12:00 Noon Wednesday June 6, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Kalsin Bay Subsection (G100) is 15 tons. Preliminary catch information indicates the catch is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

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Emergency Order No. 4-F-K-29-90

Effective Date: 12:00 Noon June 14, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Lower Olga-Moser Bay Section (AL40) and the Upper Olga Bay Section (AL50) effective at 12:00 Noon Thursday June 14, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the Lower Olga-Moser Bay Section (AL40) is 25 tons and for the Upper Olga Bay Section (AL50) is 190 tons. Preliminary catch information indicates the catch in these sections is at or over the guideline harvest level. Consequently closure of each of these management units is warranted to prevent over exploitation.

Emergency Order No. 4-F-K-34-90

Effective Date: 12:00 Noon June 22, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the South Arm Uganik Subsection (UG34) effective at 12:00 Noon Friday June 22, 1990 until further notice.

JUSTIFICATION:

The 1990 Kodiak Area Herring Sac-Roe Harvest Strategy (R.I.R. #4-K-90-11) states that the guideline harvest level for the South Arm Uganik Subsection (UG34) is 30 tons. Preliminary catch information indicates the catch in this sections is at or over the guideline harvest level. Consequently closure of the entire management unit is warranted to prevent over exploitation.

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Emergency Order No. 4-F-K-70-90

Effective Date: 6:00 P.M. September 19, 1990

EXPLANATION:

This emergency order establishes fishing periods for the 1990 Kodiak Area commercial herring food/bait fishery, and clarifies waters closed to commercial herring fishing.

The fishery began, by regulation, at 12:01 A.M. on August 1, 1990. Fishing periods will be continuous, 24 hour per day seven days per week, beginning at 6:00 P.M. September 19, 1990 through 12:00 P.M. February 28, 1991. Specific area closures will occur by emergency order as guideline harvest levels are achieved (as determined by regulation 4 AAC 27.535 (a) and (b)).

All closed waters are as described in the 1990 Commercial Herring Fishing Regulation book.

JUSTIFICATION:

Regulations adopted by the Board of Fisheries established that fishing periods for the commercial food/bait herring fishery in the Kodiak Area would be announced by Emergency Order. During the food/bait season, August 1 through February 28, the small herring stocks of the Kodiak Area are present inside and outside the bays of the area. Also present along the west side of Kodiak and Afognak Island may be the herring stocks of Kamishak Bay, of the Lower Cook Inlet Area. The Board of Fisheries has adopted a regulatory harvest strategy, 5 AAC 27.535, to insure that an overharvest of herring stocks does not occur. This harvest strategy provides for a harvest of Kodiak spawning stocks at a level not to exceed 10% of the previous spring's sac-roe harvest, and a harvest of Kamishak herring stocks not to exceed 2% of the pre sac-roe season total biomass. As identified in the 2990/92 Harvest Strategy for the Kodiak Area Management Commercial Food/Bait Herring Fishery, R.I.R. #4-K-90-23, to aid in the determination of harvest levels and stock identification the Department requires all herring fishermen and processors to register, to report each harvest as it occurs, and to provide the department with samples of each harvest. The first registrations occurred September 19, and so this Emergency Order is necessary to establish fishing periods. Anticipated low effort levels is the main reason for the continuous fishing period and may be reduced at times during the season if fishing effort becomes greater than expected.

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Emergency Order No. 4-F-K-71-90

Effective Date: 7:00 P.M. October 24, 1990

EXPLANATION:

This emergency order closes to commercial herring fishing the Kupreanof Section (Statistical Area UG10) of the Uganik Food/Bait Unit (F/B #4) effective at 7:00 P.M. Wednesday October 24, 1990 until further notice.

JUSTIFICATION:

Initial analysis of the estimated 80 tons of herring harvested from Kupreanof Straits indicate that Kamishak spawning stocks comprised a majority of this landing. Although the pre-season food/bait G.H.L. of 196 tons for Kamishak spawning stocks over-wintering in Shelikof Strait has not been reached at this time, a closure of the Kupreanof Straits Section is warranted in order to protect local Kodiak spawning stocks which may also over-winter in Kupreanof Straits.

Emergency Order No. 4-F-K-72-90

Effective Date: 12:00 Noon October 27, 1990

EXPLANATION:

This emergency order closes the following management units to commercial herring fishing effective at 12:00 Noon Saturday October 27, 1990, through 12:00 Midnight February 28, 1991.

1) West Afognak Unit (Food/Bait Unit #1)

2) North Afognak Unit (Food/Bait Unit #2)

3) Uganik Unit (Food/Bait Unit #4)

4) Uyak Unit (Food/Bait Unit #5)

5) North Mainland Unit (Food/Bait Unit #11)

6) Mid-Mainland Unit (Food/Bait Unit #12)

All remaining closed waters are as listed in the ADF&G 1990 Commercial Herring Fishing Regulations Book.

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Table 5. (page 16 of 16)

This emergency order does not supersede E.O. #4-F-K-70-90 or E.O. #4-F-K-71-90.

JUSTIFICATION:

Recent harvest estimates bring the accumulative food/bait harvest to approximately 312 tons. Based on skipper interviews, harvest locations and further analysis of A.W.L. samples taken from each food/bait harvest location and landing, the 1990/91 food/bait G.H.L. of 196 tons for Kamishak spawning stocks over-wintering in Shelikof Strait has been achieved with the current actual harvest total estimated at 188 tons and the adjusted harvest to equal 200 tons. the adjusted harvest involves converting the weight of age 4 and younger herring to age 5 as specified in the 1990/91 Kodiak Herring Food/Bait Harvest Strategy.

In accordance with the 199091 Kodiak Herring Food/Bait Harvest Strategy a closure of the following food/bait management units is warranted in order to protect Kamishak spawning stocks over-wintering in the vicinity of Shelikof Strait from additional exploitation: West Afognak Unit (FB-1), North Afognak Unit (FB-2), Uganik Unit (FB-4), Uyak Unit (FB-5), North Mainland Unit (FB-11) and the Mid Mainland Unit (FB-12). The Kupreanof Straits Section will also remain closed until further notice.

In 1990, harvests occurred in 44 management units during the sac-roe fishery. Thirty three (33) of those units were closed in-season by E.O. In the 44 management units where harvests occurred, 11 were exploited exclusively by seine gear and 7 were exploited exclusively by gill net gear (Table 4).

Six ADF&G field crews, outfitted with Single Side Band radios, marine VHF radios, inflatable rafts, 10-15 h.p. outboards, tents, personal floatation gear, camping gear and survival gear, along with one ADF&G 40 foot vessel and two 20 foot aluminum skiffs were used to monitor the major herring fisheries. The 24 hour closures which followed the 24 hour openings, along with industry cooperation, effort and biomass surveys flown by the management staff, in addition to reports from the herring field crews, were all necessary to maintain the "small stock" management strategy currently in effect.

Subsistence/Personal Use permits are issued to persons who want to obtain their own bait during the sac-roe season. Forty eight permits were issued this year and 20 have been returned accounting for approximately 10,390 pounds of herring harvested. Most of the herring harvested were used for bait.

Stock Status

General

The current management strategy, which has evolved over the last 12 years of this fishery, considers each management unit as a stock. These geographic units represent relatively predictable stocks of herring relative to estimated biomass, age composition, timing and spawning locations. The relatively small stocks associated with these units are vulnerable to excessive harvests when considering their predictability, the efficiency of the seine and gill net fleet, and the strategy which allows effort to initiate fishing activities within established fishing periods. Adequately regulating the annual harvest on each stock is accomplished by

establishing prudent guideline harvest levels and the use of "on the grounds" field crews to monitor effort and harvest activity. The use of mobile field crews assists in implementing objective in-season evaluations of stock performance and fishery performance to prevent excessive harvests on each stock.

Spawning Biomass

The 1990 spawning biomass index for that portion of the Kodiak Area fished was approximately 15,500 tons as estimated by ADF&G surveys. The sac-roe harvest of 2,347 tons represented an indexed exploitation rate of 15%, which compares with past years exploitation rates which have ranged from 19% in 1989 to 41% in 1986.

These exploitation rates should be qualified, in that ADF&G's annual observations represent an unknown and undoubtedly highly variable proportion of the actual biomass. Nevertheless, these exploitation rates can be used for trend evaluation, but they should not be compared to the spawning biomass indices achieves by ADF&G in Prince William Sound, Cook Inlet and the Bering Sea where each has a relatively large biomass available for aerial indexing and where that portion of the observed biomass may annually be less variable, i.e. there is greater opportunity for observing a greater and more consistent proportion of the actual total biomass. Consequently, the exploitation rates achieved in those fisheries should be more meaningful and comparable between each area's fisheries.

It has been estimated by staff and commercial spotter pilots, that as little as one-quarter to one-half of the actual biomass is observed for Kodiak area stocks. This is a result of the relatively low biomass levels of these stocks, the numerous small schools associated with each stock, the long duration of time over which the entire spawning biomass for each stock disperses its spawning effort, and the amount of dedicated aerial effort expended

by both ADF&G and commercial spotters during the duration of spawning period which extends from approximately early April to early August.

In 1990, age 3 year old herring accounted for 52% of the commercial harvest with age 6 and 7 year old herring accounting for 29% of the harvest (Table 6). Considering the excellent recruitment seen in 1990 (Tables 7, 8, and 9), combined with the high abundance of age 2 year old juvenile herring observed this year, the Kodiak area biomass, in general, appears to be on a healthy trend. (Additional AWL data is available in Figure 2). The current age composition of the Kodiak area biomass, increased spawn observations, overall good stock and fishery performance are all indicators that the Kodiak area biomass should continue to support a stable sac-roe fishery during the upcoming years.

1991 Management Plans and Issues

No regulatory changes are expected from the Alaska State Board of Fisheries since the Kodiak herring fishery is not scheduled for board review. The 1991 sac-roe management plan is expected to be similar to those plans in effect since 1982.

The guideline harvest levels in 1991 for the various stocks will reflect stock status. Although the trends in both stock and fishery performance are encouraging, major increases in the G.H.L. for 1991 are not anticipated since age 3 and 4 year old herring are expected to comprise a majority of the harvest. The preliminary G.H.L. for the entire Kodiak Area in 1991 is 2,500 tons.

Reductions in the number of herring crews available, changes in fishing periods, or diminished industry cooperation could result in management changes (additional restrictions, closures, etc.) which in turn would significantly alter the "free roaming" sac-roe fishery which permit holders are currently accustomed to.

Table 6. Summary of age, weight, length data from the herring sac roe fishery stocks, Kodiak Management Area, 1990.

	AGE										
	2	3	4	5	6	7	8	9	10	11+	TOTAL/±
N	52	3986	286	254	1567	650	46	234	201	396	7672
% BY AGE	.7	52.0	3.7	3.3	20.4	8.5	.6	3.0	2.6	5.2	100%
N	52	3986	286	254	1566	650	46	234	201	396	7671
AVG. LENGTH (mm)	158	188	214	226	232	250	245	261	258	260	212
N	45	2520	218	180	954	448	27	147	113	233	4885
AVG. WEIGHT (gms)	52	95	141	167	191	248	229	280	283	290	152

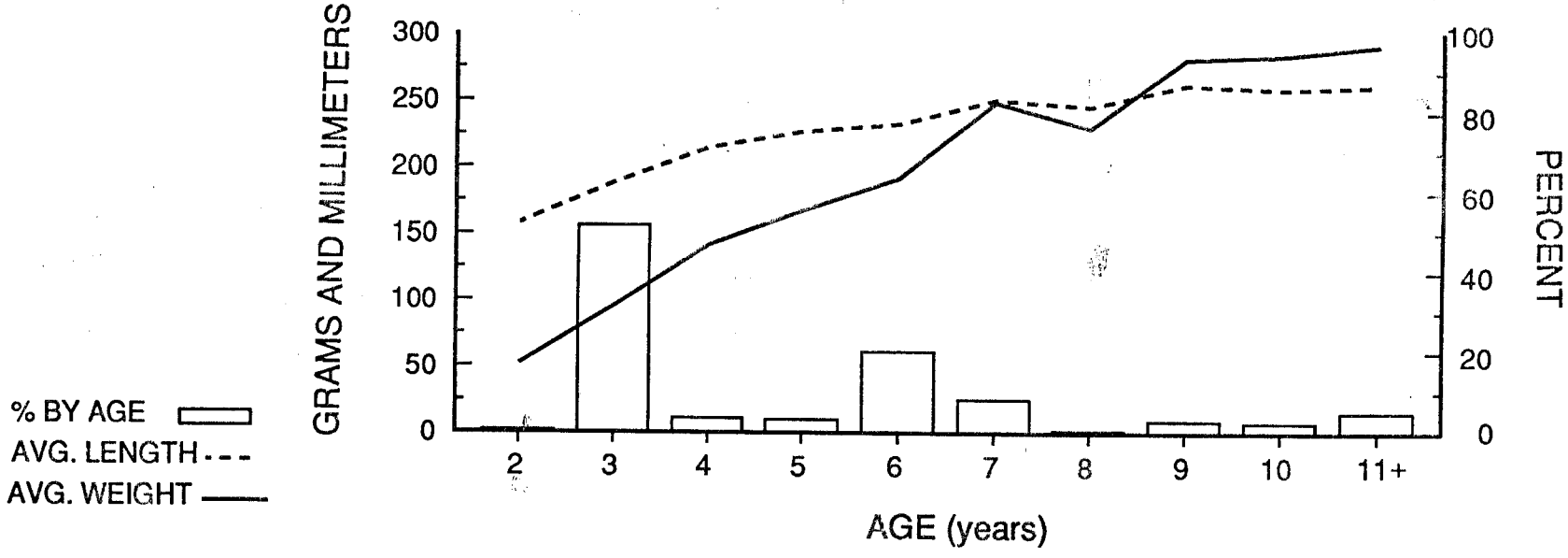


Table 7. Summary of age composition by percent of herring sac roe stocks in the Kodiak Management Area, 1990[a,b].

STOCK NAME[b] MGMT. UNIT	HARVEST (TONS)	SAMPLE DATE	AGE COMPOSITION (%) 2	3	4	5	6	7	8	9	10	11+	N
Raspberry Straits	41.9	4/28	-	11.0	2.7	6.8	77.4	1.4	.7	-	-	-	146
Malina Bay	37.6	4/18-4/19	-	11.5	2.0	9.0	75.0	2.0	.5	-	-	-	200
Paramanof Bay	41.9	4/21-4/24	-	69.4	1.5	3.6	22.4	1.5	.5	.5	-	.5	196
Perenosa Bay	29.3	4/26	-	-	1.7	15.5	36.2	19.0	-	19.0	1.7	6.9	58
S. Tonki Bay	7.2	5/2	-	45.6	5.6	14.4	27.8	3.3	1.1	-	-	2.2	90
Izhut Bay	29.2	4/23-4/24	-	19.9	5.8	2.2	47.8	17.7	1.3	2.7	2.2	.4	226
Kitoi Bay	8.9	4/18	30.5	45.3	20.1	1.1	1.1	2.1	-	-	-	-	95
Danger Bay[a]	5.3	5/3			6.6	-	9.8	42.6	1.6	16.4	18.0	4.9	61
Viekoda Bay	27.7	5/24	1.3	38.9	.9	1.3	12.8	14.1	1.3	13.2	3.8	12.4	234
Terror Bay	14.8	4/29	2.3	34.4	3.8	6.9	48.1	2.3	-	.8	.8	.8	131
Village Islands	58.3	4/27	-	23.9	1.8	6.3	54.4	11.6	-	.4	.7	1.1	285
W. Uganik Passage	22.3	4/29	-	6.5	1.6	11.3	48.4	22.6	-	-	.2	6.5	62
N.E. Arm Uganik	46.3	5/28-6/11	-	25.9	.9	2.7	45.0	13.6	.9	1.4	5.5	4.1	220
E. Arm Uganik[a]	41.2	5/11	-	-	-	-	23.1	41.1	-	2.6	12.8	20.5	39
S. Arm Uganik	51.8	5/23-6/22	2.1	57.6	1.2	.7	21.8	3.7	.2	1.4	3.7	7.5	427
Uyak Bay	242.9	5/19-5/29	-	31.1	2.3	5.1	15.8	13.6	.6	3.1	7.3	21.2	354
Brown's Lagoon	22.5	5/13-5/21	.6	76.7	.9	.9	5.9	3.7	.3	.6	4.0	6.2	322
Zachar Bay	95.5	5/20	-	59.5	-	2.5	11.6	4.1	-	2.5	2.5	17.4	121
Spiridon Bay	177.4	5/8-5/19	-	23.4	.7	3.3	8.4	4.7	1.8	3.6	15.0	39.1	274
Deadman Bay	143.5	5/13	-	71.6	3.0	3.0	11.8	8.2	.2	1.4	.5	.5	440
Sulua Bay	81.3	5/20-5/21	.2	81.4	1.9	.9	4.7	8.1	.9	1.5	-	.4	531
S. Olga Bay		6/3	-	10.7	22.7	18.7	26.7	8.0	5.3	6.7	-	1.3	75
Olga Bay	184.4	6/1	1.0	20.0	35.0	22.0	18.0	3.0	1.0	-	-	-	100
W. Sitkalidak Straits	55.9	4/17-4/24	-	78.6	.4	.4	13.1	3.9	-	1.5	1.3	.7	458

- Continued -

Table 7. (page 2 of 2)

STOCK NAME[b] MGMT. UNIT	HARVEST (TONS)	SAMPLE DATE	AGE COMPOSITION (%) 2	3	4	5	6	7	8	9	10	11+	N
Barling Bay	**23.2**	4/17	1.0	88.8	1.9	-	5.8	.5	-	.5	1.0	.5	206
Amee Bay	**126.7**	4/21-4/25	-	27.3	.5	1.6	23.3	24.1	1.1	7.8	4.3	10.2	374
Tanginak Anchorage	**28.1**	5/7	-	3.2	1.6	3.2	14.5	40.3	1.6	24.2	6.5	4.8	62
Outer Kiliuda	**22.3**	5/3-5/4	-	79.6	5.2	1.3	3.0	6.1	-	3.9	.9	-	230
Inner Kiliuda	**8.1**	4/30-5/1	-	95.3	2.1	-	2.1	.5	-	-	-	-	192
Shearwater Bay	**92**	5/22	-	91.3	3.1	.6	1.9	1.9	1.3	-	-	-	160
Ugak Bay	**101.9**	5/14-5/19	-	32.8	12.0	1.6	5.7	17.7	.5	22.9	4.2	2.6	192
Pasagshak Bay	**68.6**	5/14-5/21	-	73.9	9.0	.4	5.1	8.1	-	2.1	-	1.3	234
Kalsin Bay	**11.8**	6/6	-	97.7	.8	-	.8	.8	-	-	-	-	131
Middle Bay	**16.1**	5/15	-	93.5	2.2	2.2	1.1	1.1	-	-	-	-	92
Kizhuyak Bay	**101.7**	5/4-5/5	.7	51.3	5.3	1.3	22.7	4.7	1.3	2.7	2.0	8.0	150
Kukak Bay	**75.5**	5/2	.8	26.2	7.9	5.6	42.9	5.6	.8	1.6	5.6	3.2	126
Alinchak Bay	**41.2**	5/12-5/14	-	36.9	6.7	4.7	42.3	3.4	.7	1.3	2.7	1.3	149
Wide Bay	**47.1**	5/14-5/23	-	56.3	8.7	9.6	15.3	9.6	.4	-	-	-	229
38 MGMT. UNITS	**2,231.4**		**.7**	**52.0**	**3.7**	**3.3**	**20.4**	**8.5**	**.6**	**3.0**	**2.6**	**5.2**	**7,672**

[a] All samples were from commercial purse seine catches collected by ADF&G personnel, except that samples from Danger Bay and E. Arm Uganik Bay were from commercial gillnet catches collected by ADF&G personnel.

[b] Of the 44 stocks exploited in 1990, samples were collected from 38 (95%). These 38 stocks yielded 2,231.4 tons, or 95% of the management area's total harvest of 2,347 tons.

Table 8. Summary of average lengths by age of herring sac roe stocks in the Kodiak Management Area, 1990[a,b].

STOCK NAME[b] MGMT. AREA	HARVEST (TONS)	SAMPLE DATE	LENGTH-AT-AGE 2	3	4	5	6	7	8	9	10	11+	TOTAL AVG.	N
Raspberry Straits	41.9	4/28	-	184	199	212	217	224	248	-	-	-	213	145
Malina Bay	37.6	4/18-4/19	-	192	208	220	222	233	244	-	-	-	218	200
Paramanof Bay	41.9	4/21-4/24	-	185	206	215	219	238	218	277	-	264	196	196
Perenosa Bay	29.3	4/26	-	-	223	230	239	252	-	261	261	271	247	58
S. Tonki Bay	7.2	5/2	-	190	223	226	236	248	257	-	-	260	214	90
Izhut Bay	29.2	4/23-4/24	-	193	222	229	231	248	245	266	263	282	228	226
Kitoi Bay	8.9	4/18	165	191	222	232	237	238	-	-	-	-	191	95
Danger Bay[1/]	5.3	5/3	-	-	233	-	239	257	253	265	265	265	257	61
Viekoda Bay	27.7	5/24	162	184	206	237	242	250	253	259	257	264	225	234
Terror Bay	14.8	4/29	120	184	212	219	220	226	-	257	263	248	206	131
Village Islands	58.3	4/27	-	188	211	226	222	244	-	241	253	261	217	285
W. Uganik Passage	22.3	4/29	-	186	215	215	225	248	-	-	256	258	229	62
N.E. Arm Uganik	46.3	5/28-6/11	-	193	200	232	234	246	238	248	257	256	227	220
E. Arm Uganik[1/]	41.2	5/11	-	-	-	-	238	248	-	259	255	261	249	39
S. Arm Uganik	51.8	5/23-6/22	149	188	205	229	236	241	220	252	253	257	209	427
Uyak Bay	242.9	5/19-5/29	-	186	215	228	233	240	230	239	251	255	225	354
Brown's Lagoon	22.5	5/13-5/21	144	184	188	235	227	244	231	250	251	256	197	322
Zachar Bay	95.5	5/20	-	184	-	235	226	241	-	248	253	252	208	121
Spiridon Bay	177.4	5/8-5/19	-	185	216	224	236	243	242	256	256	258	237	274
Deadman Bay	143.5	5/13	-	186	204	222	232	249	246	246	256	234	200	440
Sulua Bay	81.3	5/20-5/21	175	185	206	219	235	243	229	261	-	229	194	531
S. Olga Bay		6/3	-	175	210	223	231	234	238	243	-	263	221	75
Olga Bay	184.4	6/1	141	177	210	219	228	224	230	-	-	-	208	100
W. Sitkalidak Straits	55.9	4/17-4/24	-	197	209	235	251	259	-	263	264	275	209	458

- Continued -

Table 8. (page 2 of 2)

STOCK NAME[b] MGMT. AREA	HARVEST (TONS)	SAMPLE DATE	LENGTH-AT-AGE 2	3	4	5	6	7	8	9	10	11+	TOTAL AVG.	N
Barling Bay	**23.2**	4/17	175	202	217	-	254	271	-	274	268	283	207	206
Amee Bay	**126.7**	4/21-4/25	-	202	215	243	253	262	254	265	267	272	244	374
Tanginak Anchorage	**28.1**	5/7	-	202	208	233	242	259	270	265	268	266	256	62
Outer Kiliuda	**22.3**	5/3-5/4	-	197	214	237	251	257	-	260	267	-	207	230
Inner Kiliuda	**8.1**	4/30-5/1	-	195	219	-	252	245	-	-	-	-	197	192
Shearwater Bay	**92**	5/22	-	200	224	238	256	258	264	-	-	-	203	160
Ugak Bay	**101.9**	5/14-5/19	-	195	218	236	252	259	267	268	266	273	235	192
Pasagshak Bay	**68.6**	5/14-5/21	-	196	217	239	251	260	-	262	-	276	208	234
Kalsin Bay	**11.8**	6/6	-	197	223	-	222	262	-	-	-	-	198	131
Middle Bay	**16.1**	5/15	-	191	213	237	247	262	-	-	-	-	194	92
Kizhuyak Bay	**101.7**	5/4-5/5	153	188	221	220	231	260	266	264	263	266	214	150
Kukak Bay	**75.5**	5/2	131	187	220	226	238	248	258	259	263	268	225	126
Alinchak Bay	**41.2**	5/12-5/14	-	185	213	235	239	247	262	258	260	275	219	149
Wide Bay	**47.1**	5/14-5/23	-	189	217	235	239	246	256	-	-	-	209	229
38 MGMT. UNITS	**2,231.4**		**158**	**188**	**214**	**226**	**232**	**250**	**245**	**261**	**258**	**260**	**212**	**7,671**

[a] All samples were from commercial purse seine catches collected by ADF&G personnel, except that samples from Danger Bay and E. Arm Uganik Bay were from commercial gillnet catches collected by ADF&G personnel.

[b] Of the 44 stocks exploited in 1990, samples were collected from 38 (95%). These 38 stocks yielded 2,231.4 tons, or 95% of the management area's total harvest of 2,347 tons.

Table 9. Summary of average lengths by age of herring sac roe stocks in the Kodiak Management Area, 1990[a,b].

STOCK NAME[b] MGMT. AREA	HARVESTb (TONS)	SAMPLE DATE	LENGTH-AT-AGE 2	3	4	5	6	7	8	9	10	11+	TOTAL AVE.	N
Raspberry Straits	41.9	4/28	-	-	-	-	-	Spawn-outs		-	-	-	-	-
Malina Bay	37.6	4/18-4/19	-	98	129	155	158	190	212	-	-	-	151	154
Paramanof Bay	41.9	4/21-4/24	-	81	115	143	150	219	154	323	-	258	104	195
Perenosa Bay	29.3	4/26	-	-	147	173	198	247	-	279	281	306	227	58
S. Tonki Bay	7.2	5/2	-	91	148	156	195	241	231	-	-	268	141	86
Izhut Bay	29.2	4/23-4/24	-	94	167	196	203	248	238	271	320	280	184	165
Kitoi Bay	8.9	4/18	55	92	154	171	222	212	-	-	-	-	98	95
Danger Bay[a]	5.3	5/3	-	-	195	-	219	263	226	295	280	299	265	56
Viekoda Bay	27.7	5/24	70	99	111	168	200	243	212	261	258	273	211	101
Terror Bay	14.8	4/29	19	80	130	144	154	183	-	267	272	280	128	131
Village Islands	58.3	4/27	-	90	146	178	175	231	-	-	-	305	156	125
W. Uganik Passage	22.3	4/29	-	87	162	142	169	234	-	-	274	281	186	62
N.E. Arm Uganik	46.3	5/28-6/11	-	96	114	177	206	248	-	287	307	271	176	106
E. Arm Uganik[a]	41.2	5/11	-	-	-	-	204	237	-	287	269	262	240	39
S. Arm Uganik	51.8	5/23-6/22	53	92	120	192	192	219	-	291	309	297	117	141
Uyak Bay	242.9	5/19-5/29	-	96	148	190	193	220	188	233	255	275	204	243
Brown's Lagoon	22.5	5/13-5/21	25	80	104	-	-	-	-	-	-	-	80	60
Zachar Bay	95.5	5/20	-	102	-	-	182	249	-	247	-	249	165	50
Spiridon Bay	177.4	5/8-5/19	-	92	164	165	199	229	216	293	284	286	219	143
Deadman Bay	143.5	5/13	-	95	107	124	168	217	222	232	260	289	135	155
Sulua Bay	81.3	5/20-5/21	75	89	127	138	206	235	212	297	-	350	120	396
S. Olga Bay		6/3	-	-	-	-	-	-	-	-	-	-	-	-
Olga Bay	184.4	6/1	-	74	135	155	174	177	186	-	-	-	136	99
W. Sitkalidak Straits	55.9	4/17-4/24	-	102	136	174	257	288	-	293	306	329	137	348

- Continued -

Table 9. (page 2 of 2)

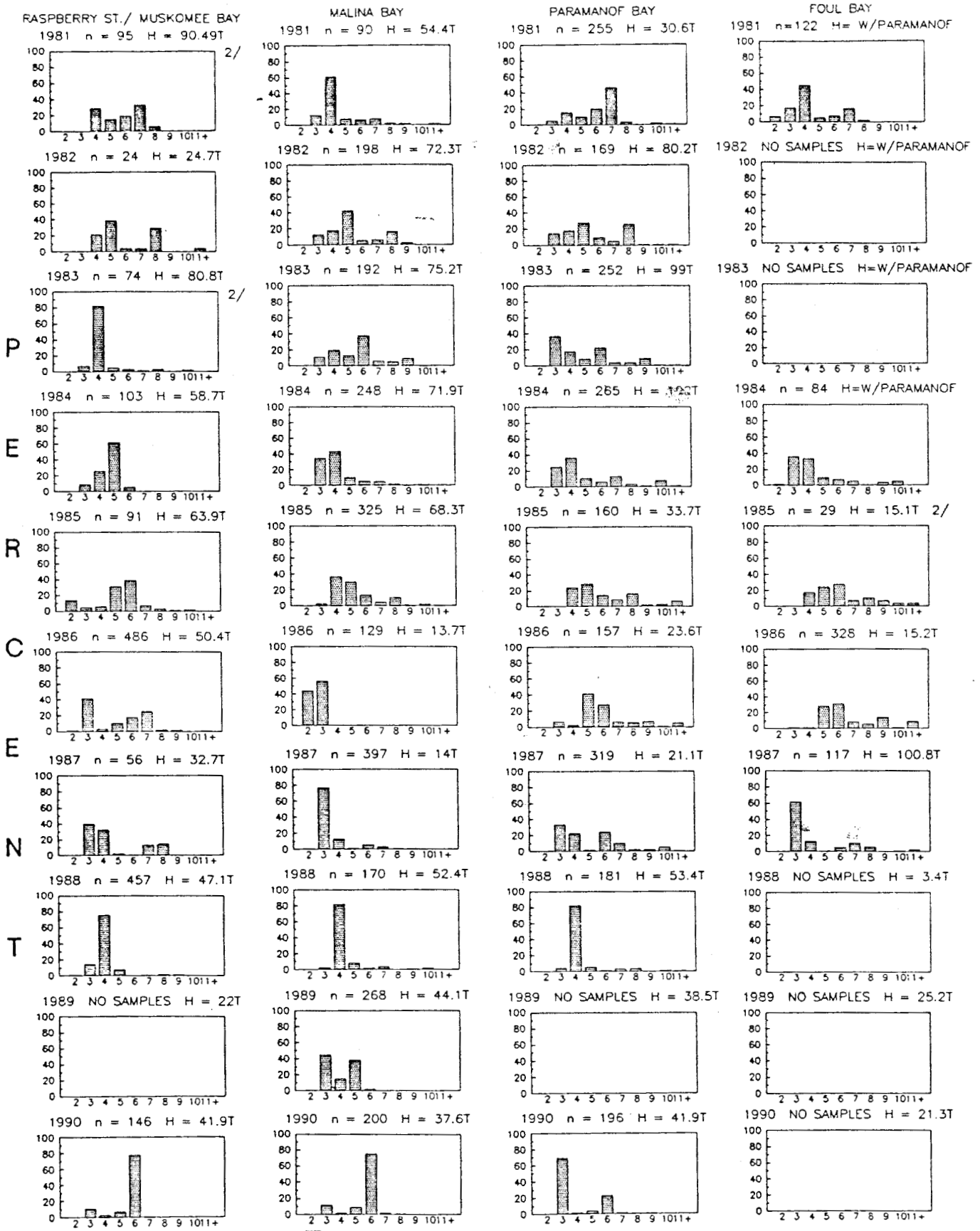
STOCK NAME[b] MGMT. AREA	HARVEST[b] (TONS)	SAMPLE DATE	LENGTH-AT-AGE 2	3	4	5	6	7	8	9	10	11+	TOTAL AVE.	N
Barling Bay	**23.2**	4/17	60	107	137	-	243	302	-	365	304	388	125	160
Amee Bay	**126.7**	4/21-4/25	-	106	128	220	247	279	233	297	301	332	214	259
Tanginak Anchorage	**28.1**	5/7	-	114	137	194	228	279	329	299	320	323	272	61
Outer Kiliuda Bay	**22.3**	5/3-5/4	-	106	141	201	245	265	-	283	315	-	136	190
Inner Kiliuda Bay	**8.1**	4/30-5/1	-	100	135	-	241	205	-	-	-	-	106	122
Shearwater Bay	**92**	5/22	-	103	151	198	248	251	273	-	-	-	122	78
Ugak Bay	**101.9**	5/14-5/19	-	98	145	194	211	276	-	296	296	378	167	90
Pasagshak Bay	**68.6**	5/14-5/21	-	97	140	207	226	264	-	268	-	322	132	205
Kalsin Bay	**11.8**	6/6	-	102	181	-	156	296	-	-	-	-	107	69
Middle Bay	**16.1**	5/15	-	88	128	189	220	252	-	-	-	-	95	83
Kizhuyak Bay	**101.7**	5/4-5/5	46	86	127	136	185	270	299	281	280	302	150	148
Kukak Bay	**75.5**	5/2	23	85	148	162	196	230	261	248	279	311	171	126
Alinchak Bay	**41.2**	5/12-5/14	-	80	125	183	194	224	248	253	283	305	155	107
Wide Bay	**47.1**	5/14-5/23	-	92	145	185	206	229	213	-	-	-	136	179
38 MGMT. UNITS	**2,231.4**		**52**	**95**	**141**	**167**	**191**	**248**	**229**	**280**	**283**	**290**	**152**	**4,688**

[a] All samples were from commercial purse seine catches collected by ADF&G personnel, except that samples from Danger Bay and E. Arm Uganik Bay were from commercial gillnet catches collected by ADF&G personnel.

[b] Of the 44 stocks exploited in 1990, samples were collected from 38 (95%). These 38 stocks yielded 2,231.4 tons, or 95% of the management area's total harvest of 2,347 tons.

Figure 2. (page 1 of 13)

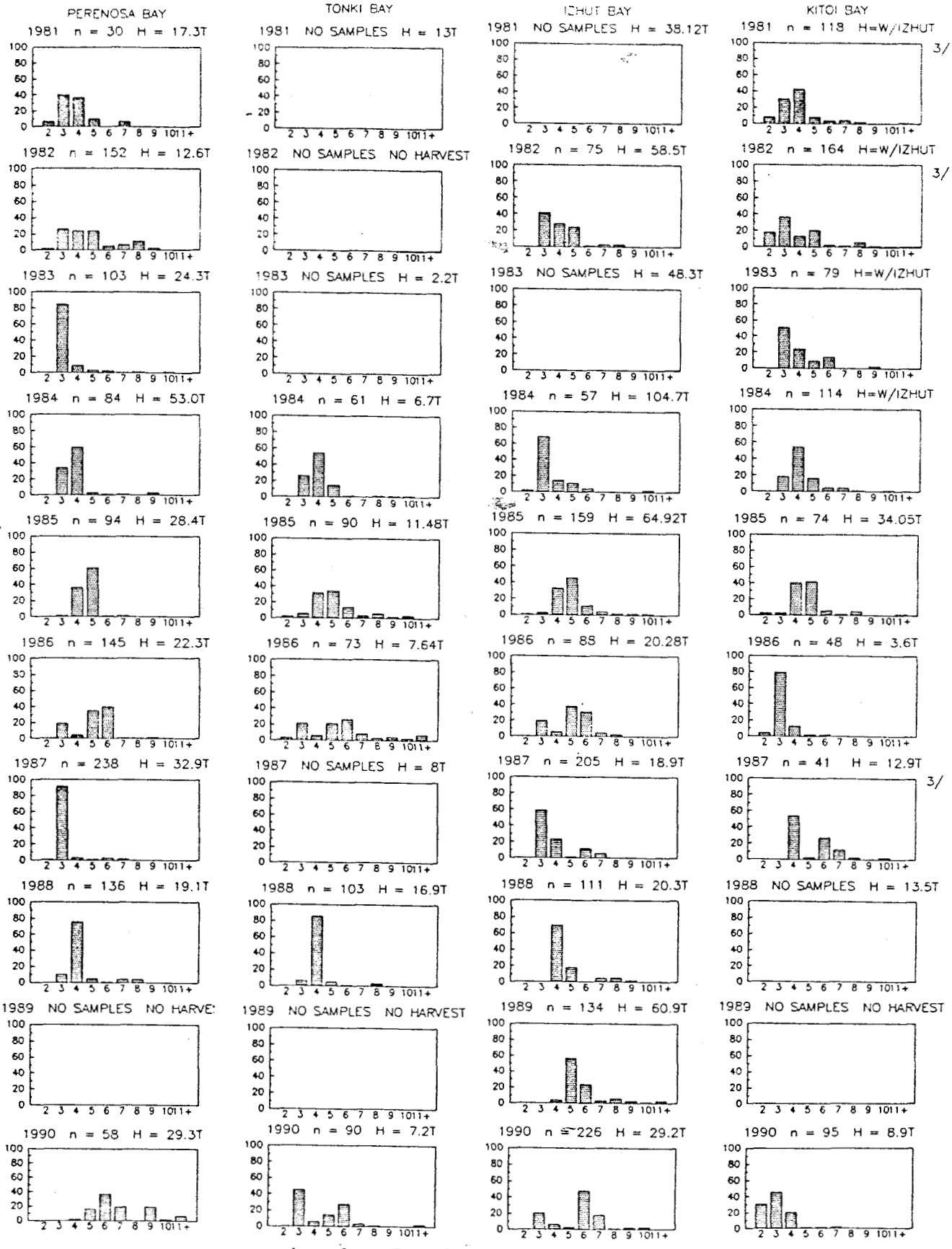
KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

Figure 2. (page 2 of 13)

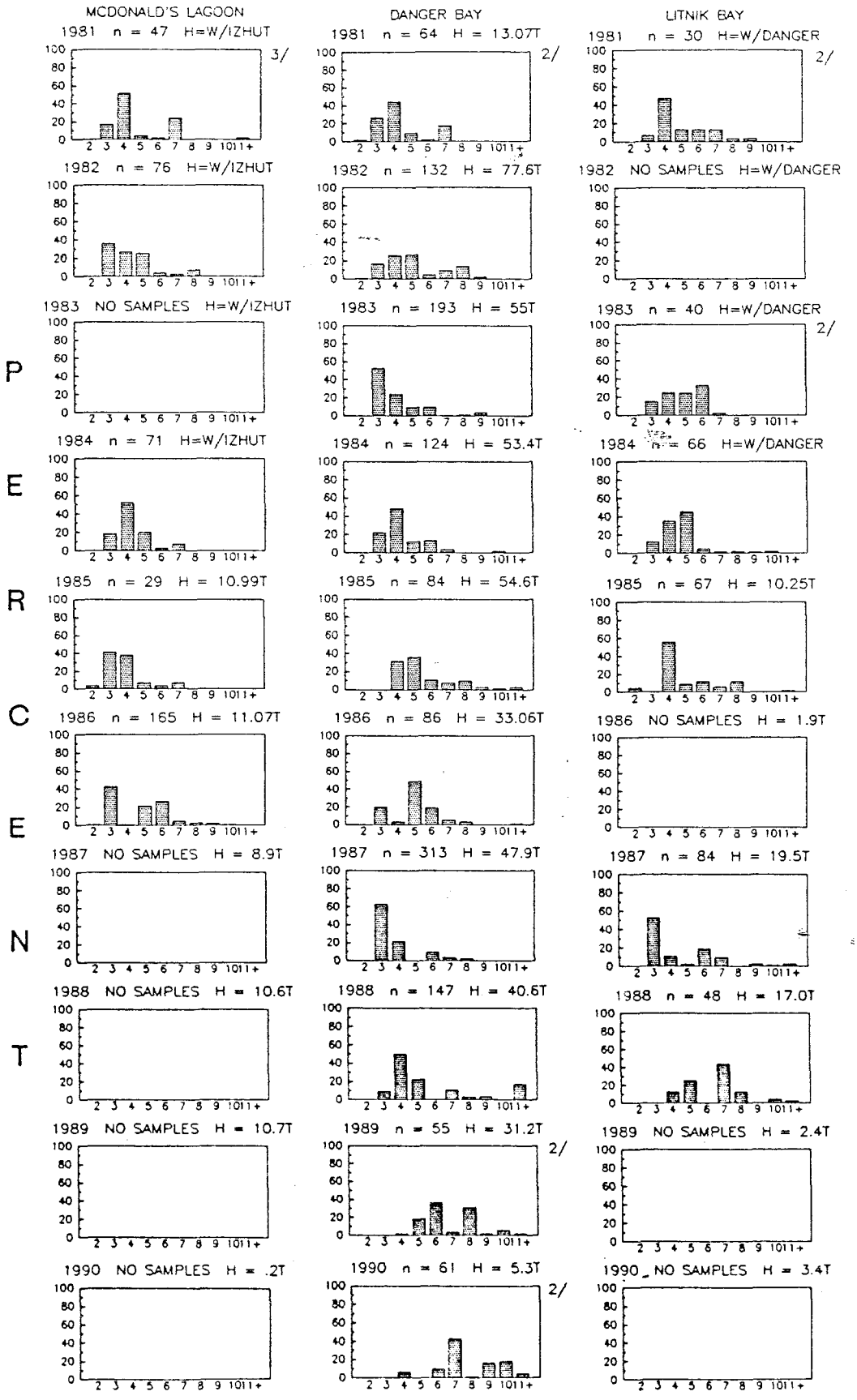
KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

Figure 2. (page 3 of 13)

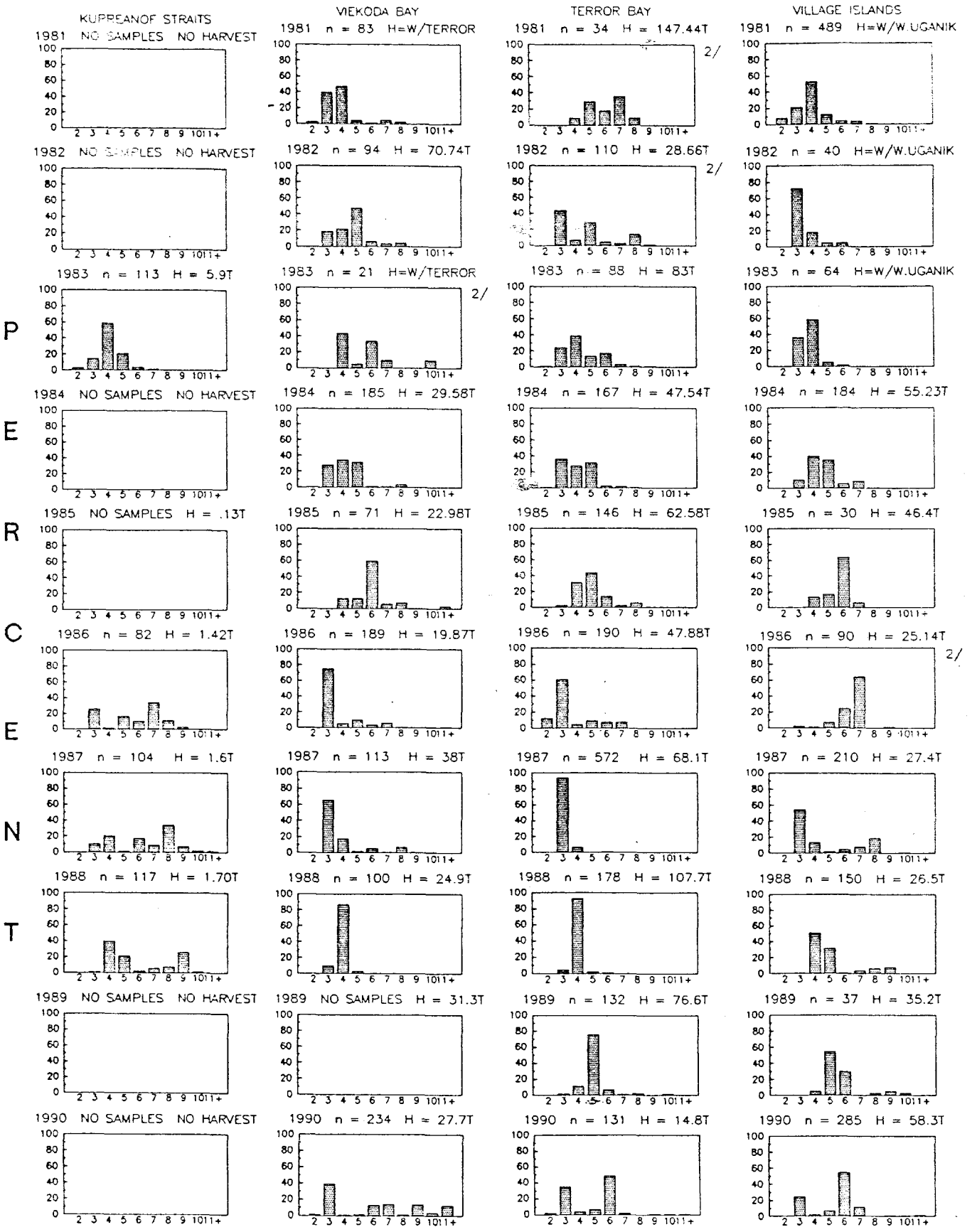
KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

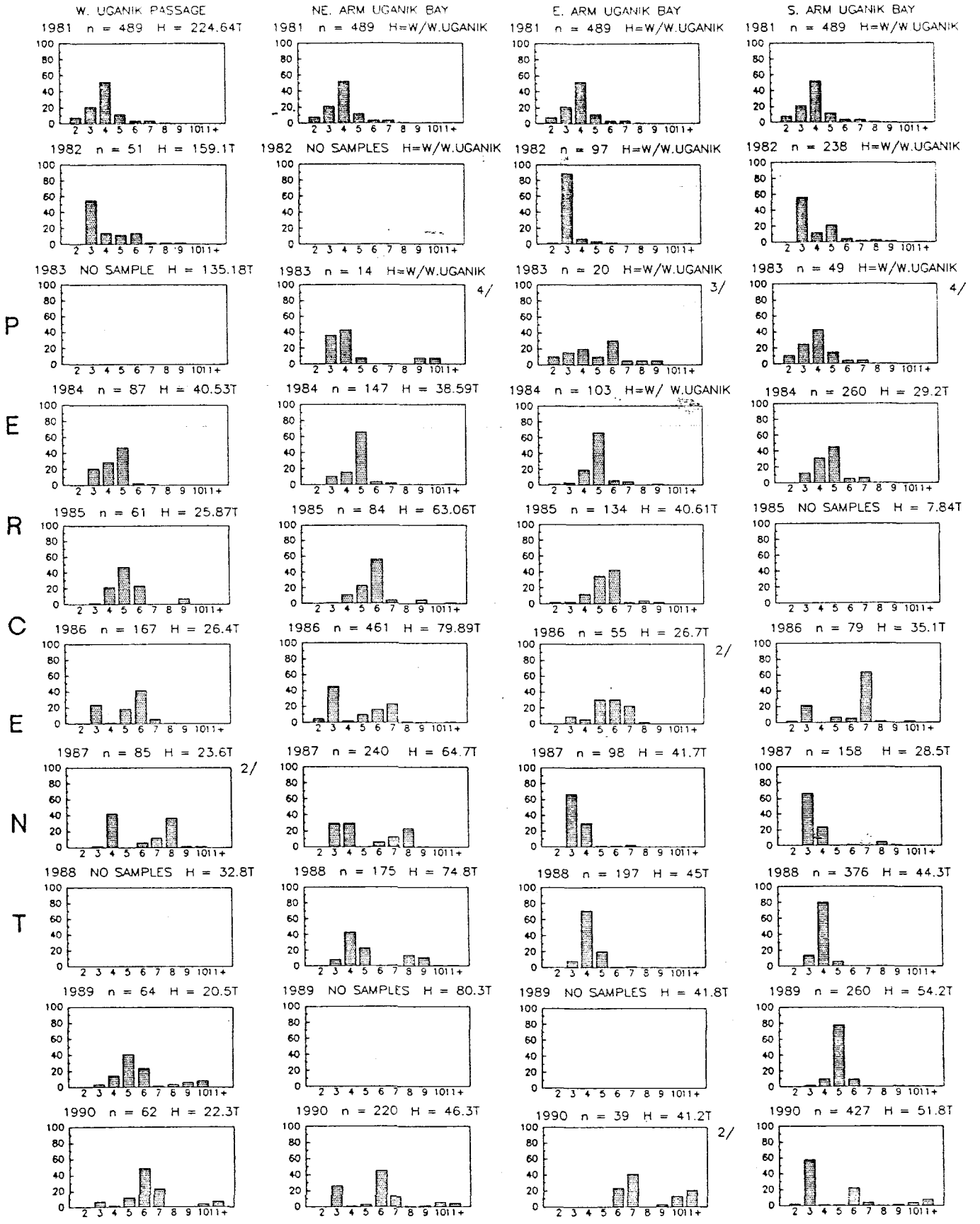
Figure 2. (page 4 of 13)

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

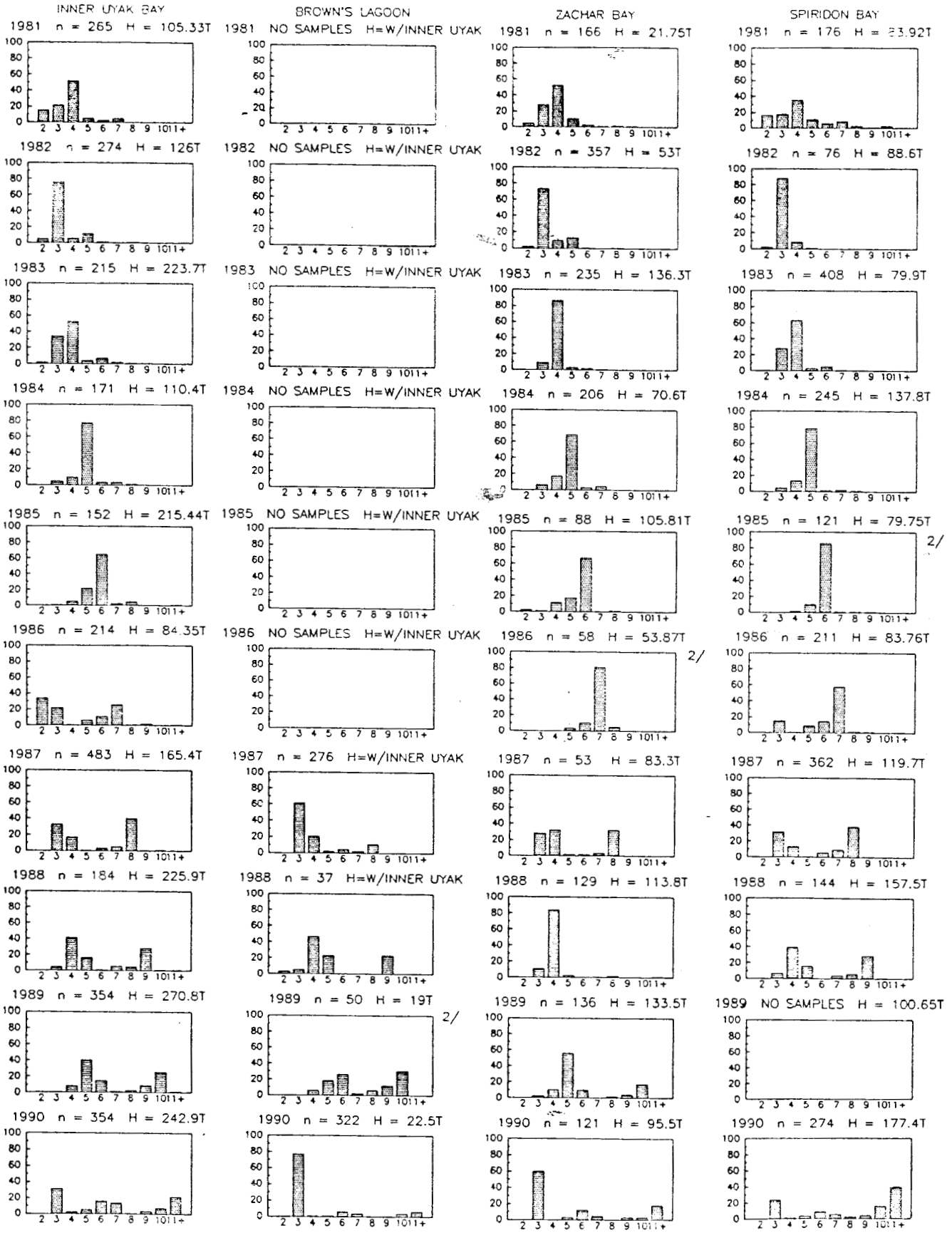
KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

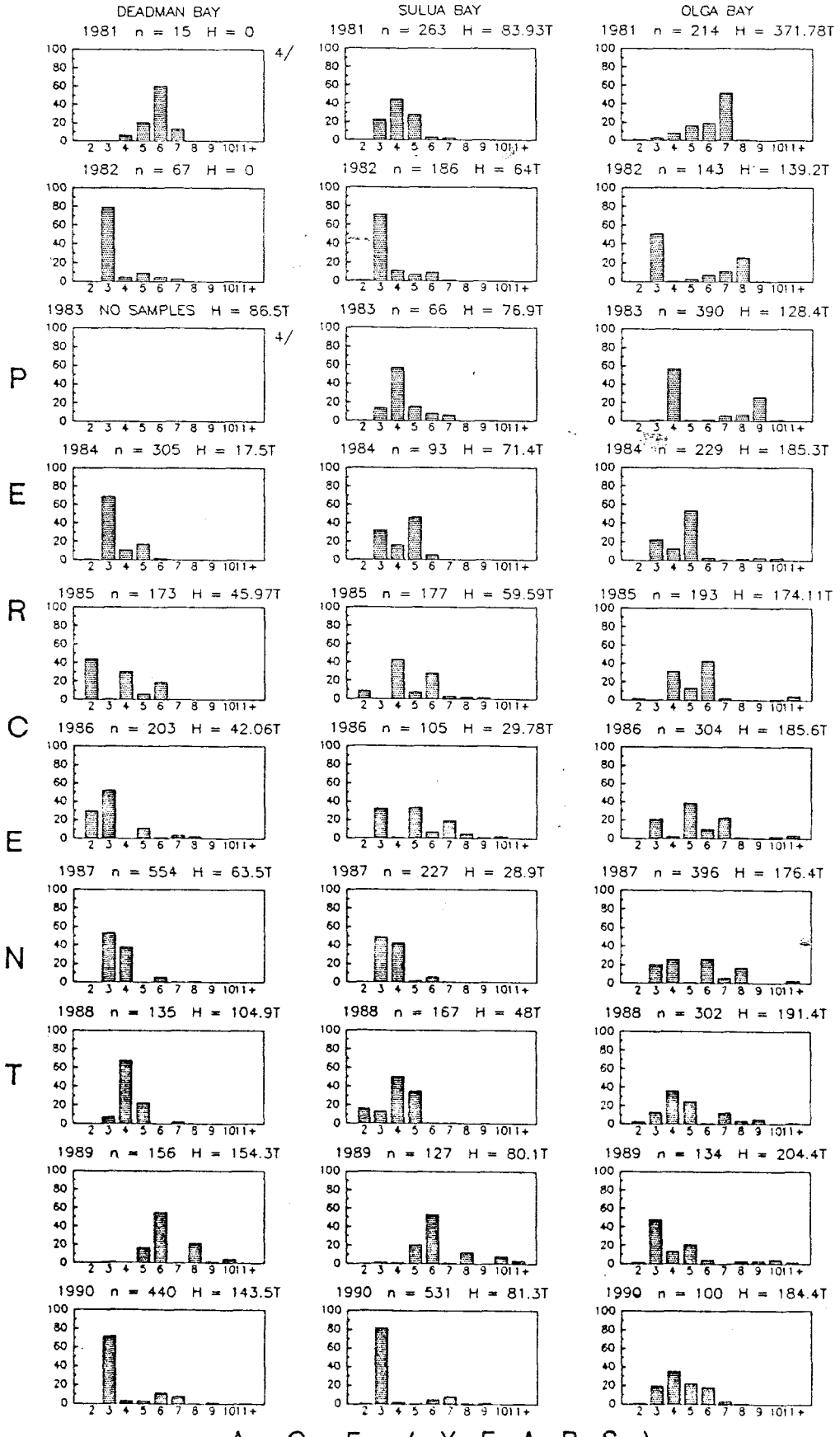
Figure 2. (page 6 of 13)

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

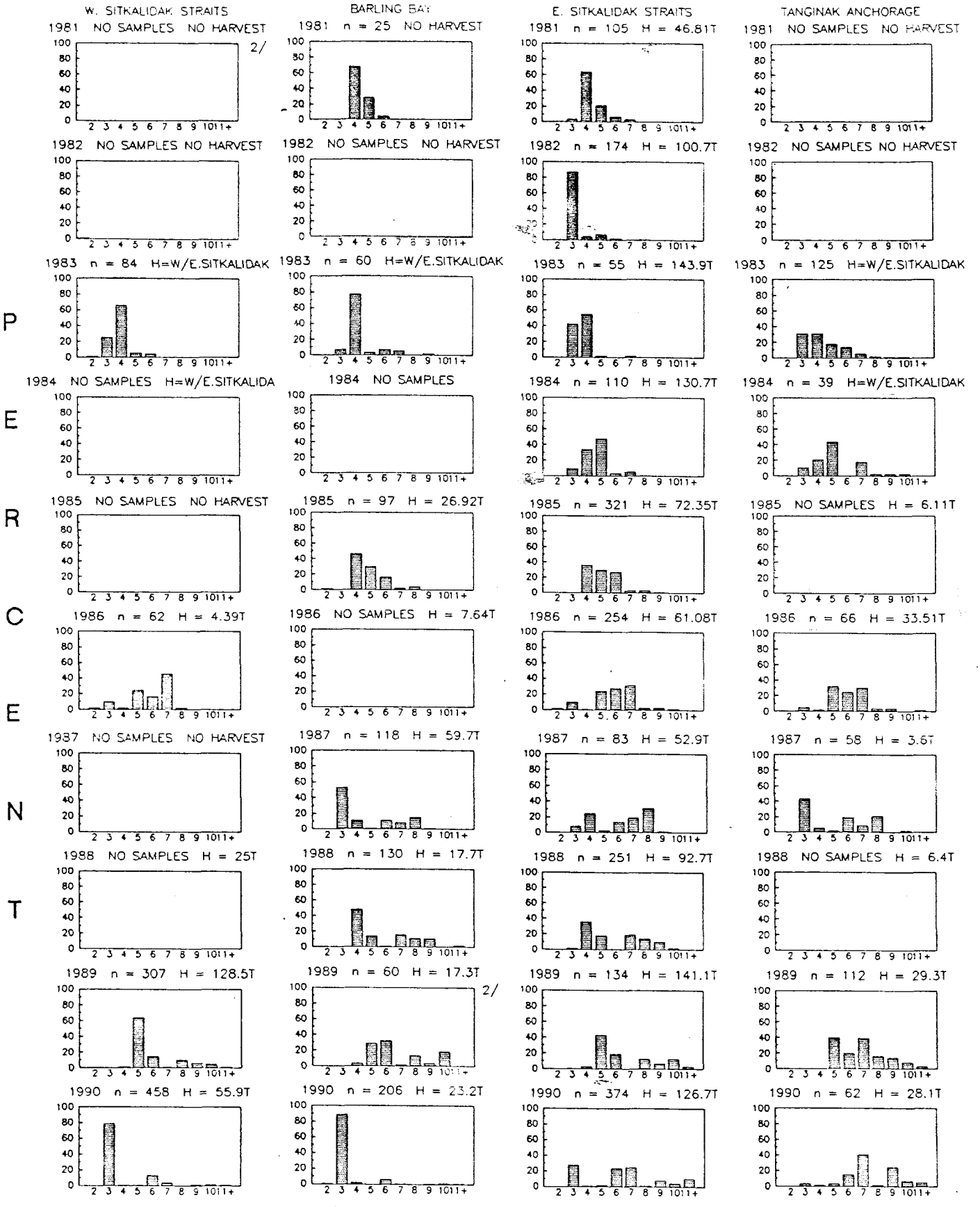
KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

Figure 2. (page 8 of 13)

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

Figure 2. (page 9 of 13)

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *

	INNER KILIUDA BAY	SHEARWATER BAY	OUTER UGAK BAY	INNER UGAK BAY
	1981 NO SAMPLES NO HARVEST	1981 NO SAMPLES H = 6.34T	1981 NO SAMPLES NO HARVEST	1981 n = 124 H = 58.55T
	1982 NO SAMPLES NO SAMPLES	1982 NO SAMPLES H = 49.4T	1982 NO SAMPLES NO HARVEST	1982 n = 108 H = 58.5T
P	1983 n = 68 NO HARVEST	1983 n = 38 H = 53.3T	1983 NO SAMPLES NO HARVEST	1983 n = 160 H = 105.3T
E	1984 NO SAMPLES NO HARVEST	1984 NO SAMPLES H = 19.3T	1984 NO SAMPLES NO HARVEST	1984 n = 173 H = 57.5T
R	1985 NO SAMPLES NO HARVEST	1985 n = 110 H = 23.94T	1985 NO SAMPLES NO HARVEST	1985 n = 109 H = 31.19T
C	1986 NO SAMPLES NO HARVEST	1986 NO SAMPLES H = 23.2T	1986 NO SAMPLES NO HARVEST	1986 n = 100 H = 52.4T
E	1987 n = 98 H = 20.38T	1987 n = 72 H = 16T	1987 n = 39 H = 9.6T	1987 n = 147 H = 54.1T
N	1988 n = 100 H = 6.9T	1988 n = 88 H = 16.7T	1988 n = 69 H = 34.6T	1988 n = 100 H = 30.1T
T	1989 n = 69 H = 5.3T	1989 n = 57 H = 19.8T	1989 NO SAMPLES H = 29.4T	1989 NO SAMPLES H = 54.8T
	1990 n = 192 H = 8.1T	1990 n = 160 H = 92T	1990 NO SAMPLES H = 68.6T	1990 n = 192 H = 101.9T

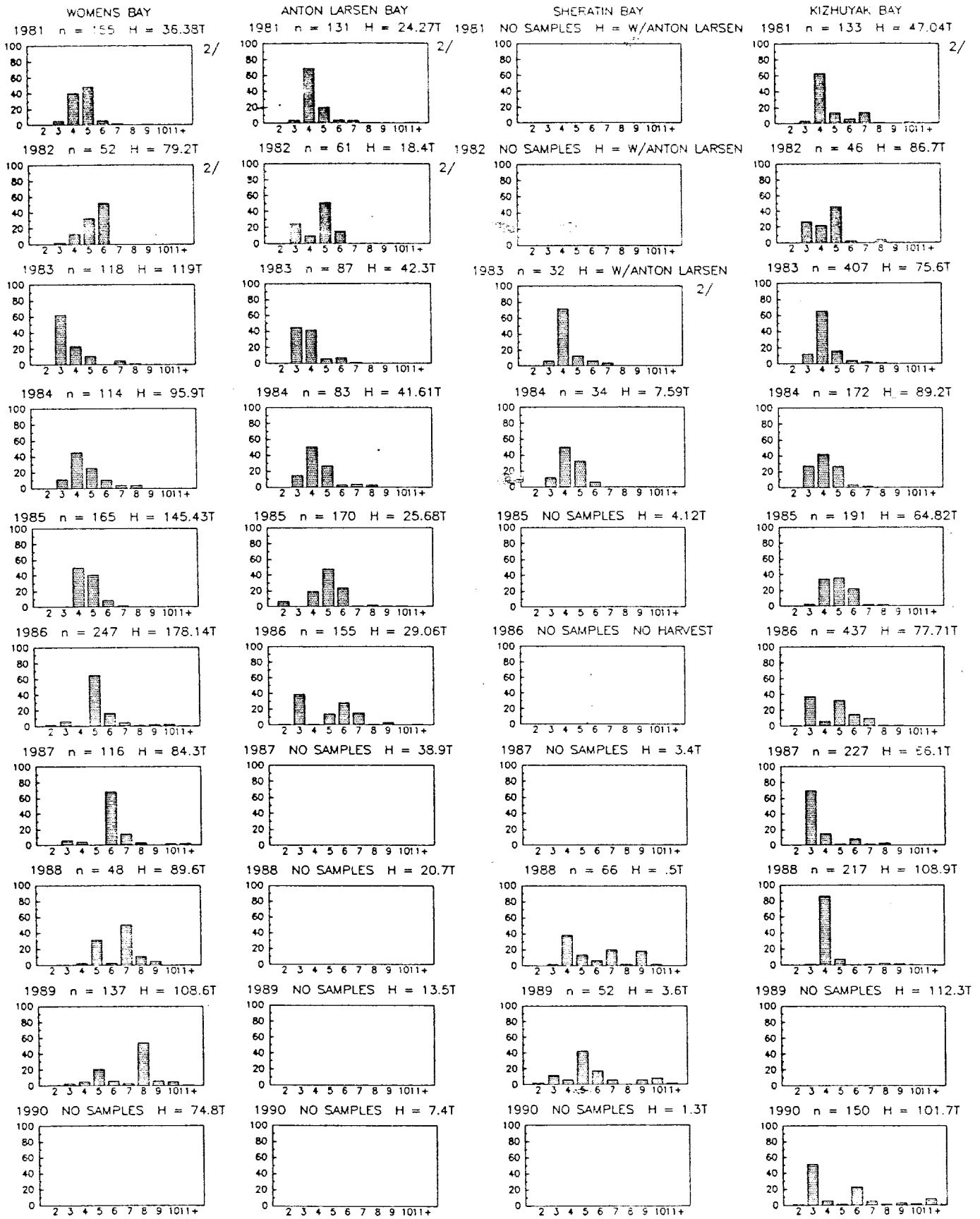
Each panel: y-axis 0 20 40 60 80 100; x-axis 2 3 4 5 6 7 8 9 10 11+

A G E (Y E A R S)

* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

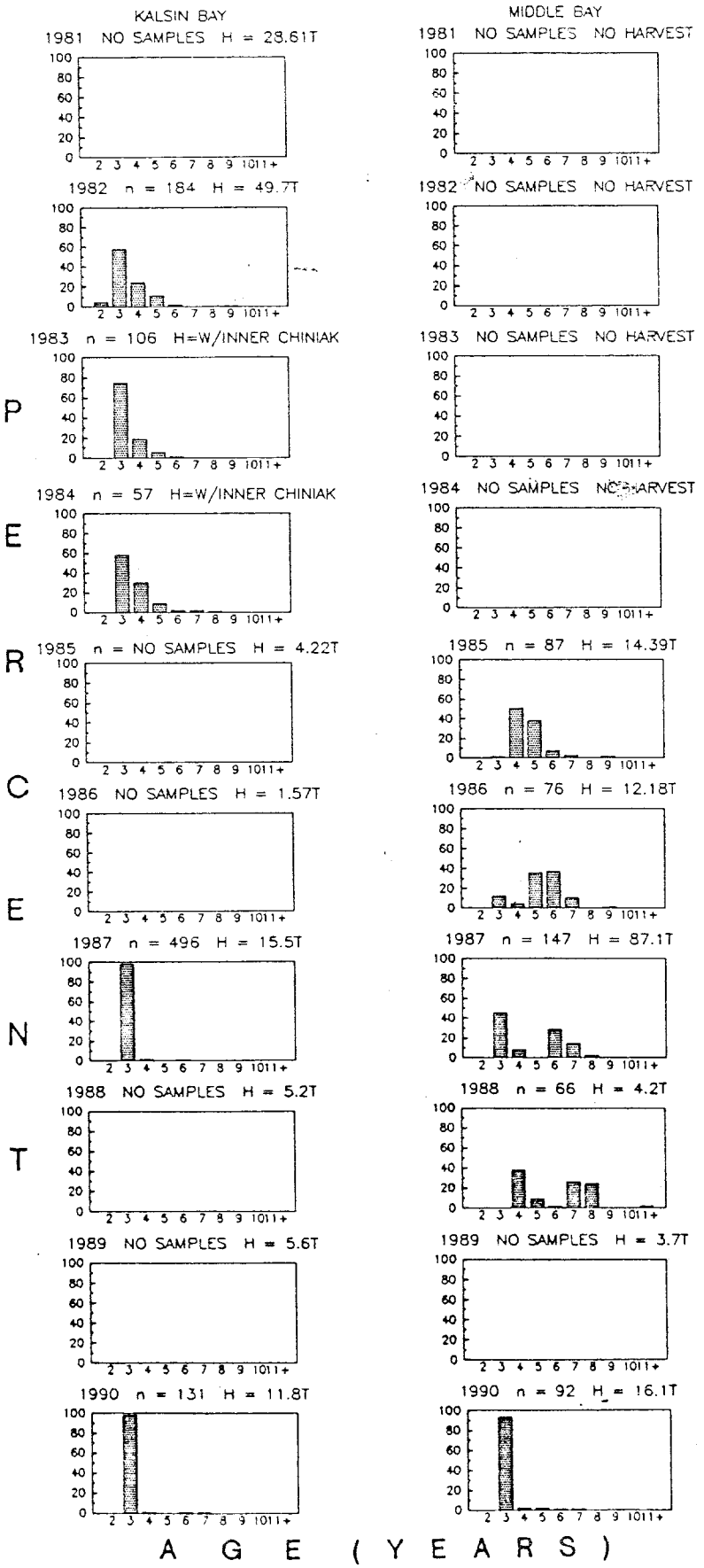
Figure 2. (page 10 of 13)

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



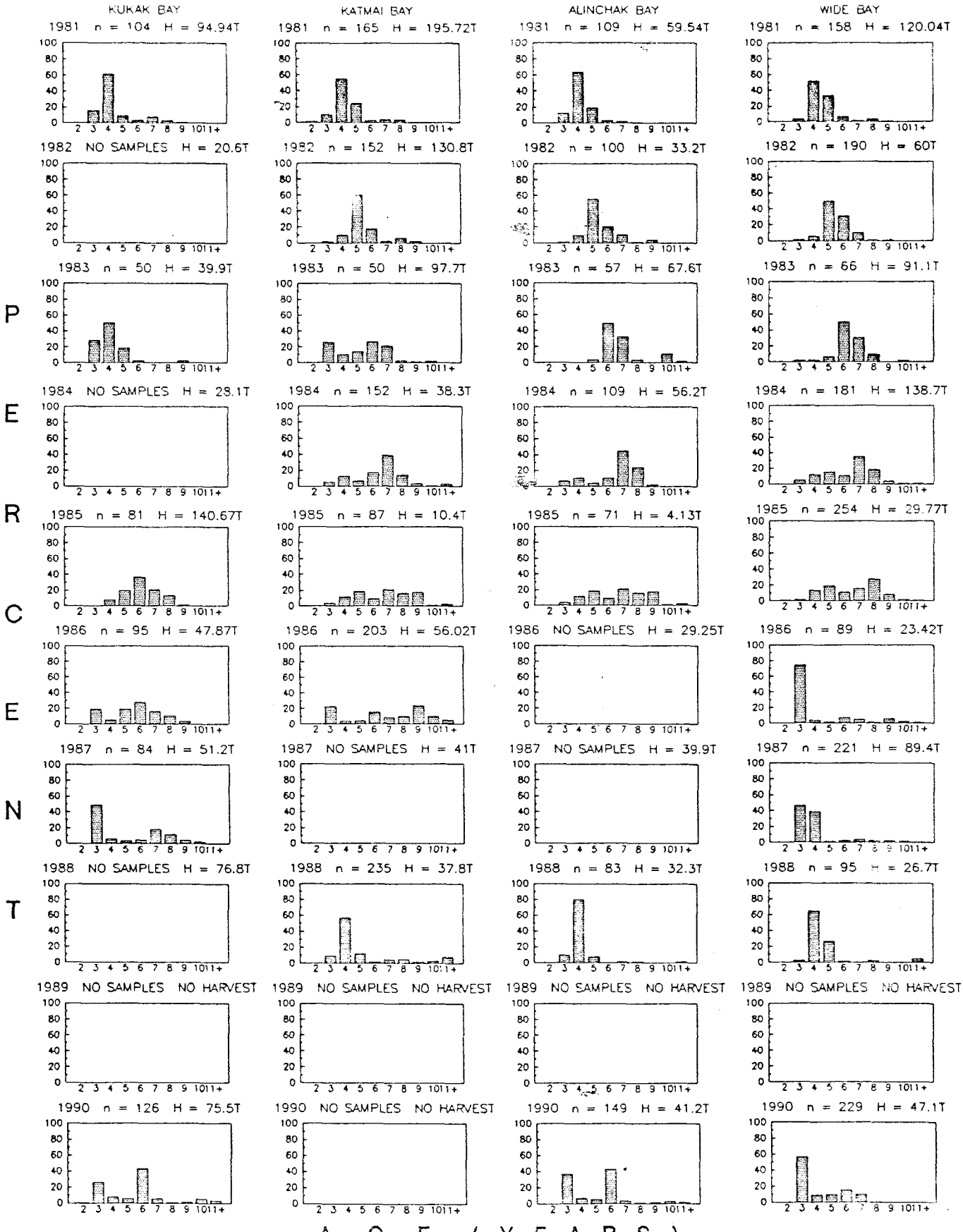
* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

KODIAK MANAGEMENT AREA
AGE FREQUENCY COMPARISONS BY MANAGEMENT UNIT BY YEAR 1/ *



* FOR FOOTNOTES SEE PAGE FOLLOWING AGE FREQUENCY GRAPHS

Figure 2. (page 13 of 13)

FOOTNOTES FOR AGE FREQUENCY COMPARISON GRAPHS

1/ ALL SAMPLES COLLECTED FROM COMMERCIAL SEINE CATCHES UNLESS OTHERWISE NOTED.

2/ COMMERCIAL GILLNET CAUGHT SAMPLE.

3/ A.D.F.& G. VARIABLE MESH GILLNET CAUGHT SAMPLE.

4/ A.D.F.& G. SHRIMP SURVEY TRAWL CAUGHT SAMPLE.

KODIAK HERRING FOOD/BAIT FISHERY

INTRODUCTION

Historical Perspective

Historically the Kodiak "food/bait" herring fishery was one of the State's three major domestic fisheries. Southeastern Alaska and Prince William Sound were the other two major fisheries. Although the earliest recorded harvest was in 1912, Kodiak's herring fishery experienced a notable expansion during the early 1920's as industry personnel searched for new areas where large herring were available. Large herring were preferred since the initial products were utilized as food products in the form of salted (primarily scotch cure) and pickled herring in response to demand for food products created by World War I. By the late 1920's the demand for food products had declined and an increase in demand for reduction products, fish meal and oil, had occurred. During the fishery's peak production years it was primarily a reduction fishery and yielded tonnages which dwarf current food/bait harvests. During a seventeen year period (1934-1950) an average harvest of 31,600 tons was sustained (Table 10). The primary product was fish meal and oil, which required large quantities of herring available for harvesting with secondary uses being limited amounts of salted food and bait products. Major harvest areas were located in eastern Shelikof Strait and adjacent bays and straits along the west side of Kodiak and Afognak Islands. Quotas for the west Shelikof quota area only) and harvest weights were measured by barrels (where 250 lb of herring equals one barrel) until 1956 when the unit of measure was changed to short tons. Historical effort involved large "sardine seiner" type vessels used in conjunction with "holding pounds" delivering to five major reduction plants. In addition, small local seine vessels and gill nets were used for a portion of the food industry delivering to floating and small shore based salting and pickling operations.

Table 10. Commercial herring fisheries historical harvest levels for the Kodiak Management Area, 1912-1990.

YEAR	FOOD & BAIT	SAC ROE	TOTAL	YEAR	FOOD & BAIT	SAC ROE	TOTAL	YEAR	FOOD & BAIT	SAC ROE	TOTAL
1912	20.0	0.0	20.0	1940	22677.0	0.0	22677.0	1968	15.4	2001.0	2016.4
1913	0.0	0.0	0.0	1941	40083.5	0.0	40083.5	1969	11.0	1130.0	1141.0
1914	0.0	0.0	0.0	1942	16791.0	0.0	16791.0	1970	7.5	342.0	349.5
1915	0.0	0.0	0.0	1943	35352.0	0.0	35352.0	1971	44.2	284.0	328.2
1916	70.0	0.0	70.0	1944	26835.0	0.0	26835.0	1972	49.8	215.0	264.8
1917	137.9	0.0	137.9	1945	31114.0	0.0	31114.0	1973	178.0	831.0	1009.0
1918	118.4	0.0	118.4	1946	47505.9	0.0	47505.9	1974	40.1	868.0	908.1
1919	259.7	0.0	259.7	1947	50743.0	0.0	50743.0	1975	5.2	8.0	13.2
1920	45.9	0.0	45.9	1948	46428.0	0.0	46428.0	1976	N/A	5.0	5.0
1921	944.9	0.0	944.9	1949	0.0	0.0	0.0	1977	N/A	338.0	338.0
1922	1482.6	0.0	1482.6	1950	44132.5	0.0	44132.5	1978	398.9	904.0	1302.9
1923	321.5	0.0	321.5	1951	4299.0	0.0	4299.0	1979	124.8	1736.0	1860.8
1924	4823.0	0.0	4823.0	1952	1389.0	0.0	1389.0	1980	380.7	2384.0	2764.7
1925	9997.0	0.0	9997.0	1953	725.0	0.0	725.0	1981	18.0	2063.0	2081.0
1926	2680.9	0.0	2680.9	1954	0.0	0.0	0.0	1982	326.0	1771.0	2097.0
1927	2592.9	0.0	2592.9	1955	0.0	0.0	0.0	1983	33.4	2319.0	2352.4
1928	625.0	0.0	625.0	1956	13524.0	0.0	13524.0	1984	123.0	2163.0	2286.0
1929	NO DATA	0.0	0.0	1957	21218.5	0.0	21218.5	1985	102.0	1968.0	2070.0
1930	622.0	0.0	622.0	1958	1711.0	0.0	1711.0	1986	213.0	1558.0	1771.0
1931	1000.0	0.0	1000.0	1959	3831.0	0.0	3831.0	1987	217.1	2146.0	2363.1
1932	3594.0	0.0	3594.0	1960	0.0	0.0	0.0	1988	340.2	2171.0	2511.2
1933	2312.5	0.0	2312.5	1961	0.0	0.0	0.0	1989	344.6	2248.6	2593.2
1934	60000.0	0.0	60000.0	1962	0.0	0.0	0.0	1990	312.6	2347.0	2659.6
1935	NO DATA	0.0	0.0	1963	0.0	0.0	0.0				
1936	24748.0	0.0	24748.0	1964	309.8	568.0	877.8				
1937	27659.3	0.0	27659.3	1965	35.0	657.0	692.0				
1938	24522.0	0.0	24522.0	1966	198.0	2769.0	2967.0				
1939	38600.5	0.0	38600.5	1967	300.3	1662.0	1962.3				

Beginning in the late 1930's annual quotas were set by the Secretary of the Interior for a portion of the Kodiak Area along the northwest sides of Kodiak, Afognak, and Shuyak Islands (quota area). From the early 1960's to 1973, there were no harvest quotas and the season was open year round. Beginning in 1974 the season dates were changed to run from August 1 through February 28, however no regulatory Guideline Harvest Levels were in effect until 1979. During 1979 and 1980 the Guideline Harvest Level was 12,600 tons for the food and bait season. As a result of the rapidly developing sac-roe fishery, the GHL for the food/bait season was reduced to 1,000 tons in 1981 and remained at that level through 1987. Regulatory GHL's for the food/bait herring fishery were initially replaced with the current regulatory harvest strategy in 1988 (5AAC 27.535).

METHODS

Fishery Characteristics

The current herring food/bait fishery can be characterized as being a secondary commercial fishery on herring concentrations located in Kodiak waters. It is primarily a bait fishery providing a frozen product for local cod and crab fishermen. Effort and yield levels are at historical lows for the food/bait fishery while the sac-roe fishery supports near record levels of effort and yield. The food/bait fishery is an open-to-entry fishery, while the sac-roe fishery has been limited-to-entry since 1982. Existing regulations designate priority status to the sac-roe fishery, in that regulatory harvest strategy allocates a very major percentage of the allowable harvest on local stocks to the sac-roe fishery.

By regulation the herring food/bait season extends from August 1 through February 28. The entire area is open to continuous fishing on August 1 for all legal gear types, which are seines, gill nets and trawls. There are no exclusive gear areas and the only gear restrictions are for maximum purse seine length of 100 fathoms and

maximum purse seine depth of 1,025 meshes and a maximum length for gill nets of 150 fathoms. All permit holders and buyers are required to register at the Kodiak ADF&G office prior to fishing or purchasing herring. At that time, management plans are issued and catch reporting procedures and current regulations are reviewed. Each landing is sampled for age, weight, length (AWL) information and extensive skipper interviews are conducted to evaluate which sac-roe stocks are being impacted.

There is a major concentration of herring which over winters in eastern Shelikof Strait adjacent to the west side of Kodiak and Afognak Islands. In 1986 a stock identification study using scale pattern analysis was performed on herring scales from fish harvested from a large biomass located along the west side of Afognak Island (Johnson 1988). The study concluded that at least 80% of the East Shelikof herring that were sampled were of Kamishak (Cook Inlet Area) spawning stock origins.

Harvest Strategy

The 1990/91 Kodiak Food/Bait Fishery Management Plan describes the current harvest strategy in detail (Appendix B.1). In March 1988, the Alaska State Board of Fisheries allocated not more than two percent of the previous season's total available spawning biomass from Kamishak to be harvested during Kodiak's food/bait herring fishery. For local Kodiak spawning stocks which are exploited during the sac-roe fishery, the food/bait GHL on those same stocks is 10% of the previous seasons sac-roe harvest.

In accordance with the addendum to the 1988 Kamishak Bay Herring Management Plan, "the allocation of herring to the Shelikof Strait food/bait fishery is based on spawning biomass", primarily age 5 and older herring and not on the biomass of juveniles. Therefore the weight of Kamishak Bay stocks age 4 and younger caught in Shelikof Strait is adjusted upward to bring the biomass of these younger age classes up to the biomass of age 5 herring.

Age 4 and younger herring were selected because in the Kamishak spawning stocks, herring are not considered to have attained

complete recruitment into the spawning biomass until they have reached age 5.

RESULTS

1990/91 Season Summary

Effort and Harvest

A total of 312.6 tons of herring were harvested, of which 188.8 tons are considered Kamishak spawning stocks and the remaining 123.8 tons are considered local Kodiak spawning stocks. The "adjusted" harvest total (converting age 4 and younger weights to age 5 weights) from the Kamishak food/bait harvest is 214.7 tons.

Five vessels (2 seine, 3 trawl) and six buyer/processors registered to participate in this fishery. The entire harvest was taken by trawl gear.

The Fishery

The 1990/91 GHL for Kamishak herring stocks over wintering in Shelikof Strait was 196 tons. An additional 280 tons was available for harvesting from the remainder of the Kodiak Management Area's local spawning stocks.

Kodiak's food/bait herring season ran from August 1 through February 28. Fishing periods were 24 hours per day and seven days a week. This year most of the harvest occurred between mid-October and early November. Three emergency orders (E.O.'s) were issued, one which established fishing periods, one which closed an individual management unit (Kupreanof Strait) and one which closed all waters of Shelikof Strait and the western portion of Kodiak,

Afognak, and Shuyak Islands to prevent additional harvest on Kamishak spawning stocks.

Herring samples were collected from each commercial harvest for age, weight and length (AWL) analysis (Table 11). These samples are used in conjunction with harvest location and skipper interviews to assist in assigning harvests to Kodiak or Kamishak spawning stocks.

ADF&G Surveys

The state research vessel R/V Resolution was used to complete two hydroacoustic survey trips to assess overwintering concentrations of herring. The first survey ran from October 31 to November 5, and the second survey ran from December 4 through December 10. During the first survey minor concentrations of herring were located and sampled (with vessel's test trawl) in Viekoda Bay, Terror Passage, Kupreanof Strait and Raspberry Strait (Table 12) Other minor concentrations of herring were located in eastern Shelikof Strait, however schools were small and a sample was not collected. Areas surveyed included Uganik Bay, Shelikof Strait from Uganik Bay north to Black Cape, Viekoda, Terror and Malina Bays. No hydroacoustic tapes were made on this survey due to the "dispersed" schooling encountered during this trip. During the second trip (December 4-10) the survey area was expanded to include Uyak, Zachar, Spiridon and Kizhuyak Bay in addition to the area covered during the first survey. Herring (AWL) samples were collected using the vessels test trawl net from Terror Passage and Raspberry Strait (Table 12). Hydroacoustical tapes were made of both herring concentrations in an attempt to estimate biomass tonnage. Budget restraints have resulted in the "tapes" not being "read" resulting in no population estimates being derived from these tapes. The physical dimensions of the largest herring concentration located during this survey was 1.5 miles long by 0.5 miles wide and the school ranged between 10-12 fathoms thick.

Table 11. Kodiak commercial food/bait herring AWL summaries, 1990-91.

Sample Period	Age (years)	Sex: Male	Sex: Female	Sex: Unknown	Total	Percent of Total	Weight: Mean (gm)	Weight: Std. Dev.	Weight: Number Weighed	Std. Length: Mean (mm)	Std. Length: Std. Dev.	Std. Length: Number Measured	Tons	Adj. Tons
KUPREANOF STRAITS														
STATISTICAL AREA UG10														
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	2	1	4	7	4.5	66	11.7	6	174	9.2	7	1.10	3.77
	3	5	1	-	6	3.9	160	19.6	4	223	4.0	6	2.27	3.23
	4	7	4	-	11	7.1	194	14.1	4	235	7.8	11	5.06	5.92
10/23	5	5	5	-	10	6.5	227	15.3	6	246	7.5	10	5.38	5.38
	6	25	12	-	37	23.9	229	29.4	20	245	8.4	37	20.11	20.11
	7	29	24	-	53	34.2	261	25.9	22	256	7.6	53	32.86	32.86
	8	2	1	-	3	1.9	-	-	-	255	8.7	3	-	-
	9	6	9	-	15	9.7	314	24.1	8	267	7.9	15	11.15	11.15
	10	2	3	-	5	3.2	318	6.3	4	268	8.0	5	3.77	3.77
	11+	2	6	-	8	5.2	305	43.0	5	266	7.8	8	5.78	5.78
Period total		85	66	4	155	100.0	238	68.2	79	248	20.8	155	87.49	91.97
RASPBERRY STRAITS														
STATISTICAL AREA A010														
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	5	1	5	11	10.2	68	15.8	11	169	12.2	11	2.62	8.08
	3	8	2	-	10	9.3	136	20.2	9	207	7.9	10	4.74	7.35
	4	8	6	-	14	13.0	199	9.6	8	230	3.0	14	9.72	10.28
10/26	5	2	1	-	3	2.8	210	-	1	235	3.6	3	2.20	2.20
	6	16	14	-	30	27.8	211	22.8	17	237	7.9	30	22.14	22.14
	7	12	8	-	20	18.5	249	26.4	12	246	8.2	20	17.40	17.40
	8	2	1	-	3	2.8	253	21.9	2	254	3.2	3	2.65	2.65
	9	1	5	-	6	5.6	318	21.6	3	264	6.5	6	6.68	6.68
	10	2	3	-	5	4.6	294	29.1	4	259	10.4	5	5.15	5.15
	11+	3	3	-	6	5.6	344	15.9	3	263	9.3	6	7.23	7.23
Period total		59	44	5	108	100.0	200	79.1	70	233	26.9	108	80.53	89.17

-Continued-

Table 11. (page 2 of 3)

Sample Period	Age (years)	Sex Male	Sex Female	Sex Unknown	Total	Percent of Total	Weight Mean (gm)	Weight Std. Dev.	Weight Number Weighed	Std. Length Mean (mm)	Std. Length Std. Dev.	Std. Length Number Measured	Tons	Adj. Tons
SHELIKOF STRAIT														
STATISTICAL AREA A050														
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	1	-	1	3.8	176	-	1	227	-	1	.03	.03
10/11	5	1	-	-	1	3.8	201	-	1	240	-	1	.03	.03
	6	1	2	1	4	15.4	203	17.6	4	245	11.0	4	.12	.12
	7	3	1	-	4	15.4	200	35.4	4	238	12.5	4	.12	.12
	8	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	5	1	-	6	23.1	231	27.0	6	248	6.5	6	.21	.21
	10	2	3	-	5	19.2	249	36.0	5	258	13.3	5	.19	.19
	11+	1	4	-	5	19.2	245	42.8	5	253	14.3	5	.18	.18
Period total		13	12	1	26	100.0	225	36.6	26	248	12.9	26	.87	.87
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	14	8	2	24	20.7	84	28.6	24	177	16.0	24	5.75	12.39
	3	13	12	-	25	21.6	139	23.0	25	200	21.6	25	9.93	12.91
	4	5	8	-	13	11.2	170	39.7	13	219	11.1	13	6.28	6.71
10/18	5	6	6	-	12	10.3	181	27.1	12	224	10.2	12	6.20	6.20
	6	9	7	-	16	13.8	213	37.0	16	232	11.8	16	9.69	9.69
	7	3	5	-	8	6.9	252	38.5	8	246	8.4	8	5.74	5.74
	8	3	-	-	3	2.6	253	30.8	3	244	11.7	3	2.16	2.16
	9	3	3	-	6	5.2	270	37.5	6	246	10.7	6	4.61	4.61
	10	2	1	-	3	2.6	295	30.5	3	254	3.8	3	2.52	2.52
	11+	2	4	-	6	5.2	306	34.6	6	266	10.2	6	5.23	5.23
Period total		60	54	2	116	100.0	176	73.7	116	216	30.4	116	58.10	68.14

-Continued-

Table 11. (page 3 of 3)

Sample Period	Age (years)	Sex: Male	Sex: Female	Sex: Unknown	Total	Percent of Total	Weight: Mean (gm)	Weight: Std. Dev.	Weight: Number Weighed	Std. Length: Mean (mm)	Std. Length: Std. Dev.	Std. Length: Number Measured	Tons	Adj. Tons
SHELIKOF STRAIT (continued)														
STATISTICAL AREA A050														
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	1	1	.6	41	-	1	147	-	1	.06	.28
	2	19	19	9	47	28.3	72	14.0	22	176	9.4	47	4.63	13.23
	3	11	12	-	23	13.9	128	23.5	17	210	11.8	23	4.03	6.48
	4	3	1	-	4	2.4	176	4.9	2	229	4.3	4	.96	1.13
10/22	5	4	7	-	11	6.6	205	17.9	9	238	6.6	11	3.10	3.10
	6	6	16	-	22	13.3	228	30.2	19	246	7.7	22	6.88	6.88
	7	16	4	-	20	12.0	260	27.2	13	255	8.0	20	7.14	7.14
	8	3	-	-	3	1.8	265	23.3	2	252	8.0	3	1.09	1.09
	9	5	6	-	11	6.6	296	39.0	7	268	9.0	11	4.47	4.47
	10	6	2	-	8	4.8	281	31.1	6	261	7.6	8	3.09	3.09
	11+	11	5	-	16	9.6	313	45.6	13	267	10.7	16	6.86	6.86
Period total		84	72	10	166	100.0	199	90.3	111	225	37.2	166	42.30	53.74
	0	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	36	33	40	109	55.9	76	13.6	57	176	8.2	109	13.93	36.68
	3	13	9	-	22	11.3	132	20.7	10	207	8.2	22	4.90	7.40
	4	3	4	-	7	3.6	177	21.4	3	229	6.6	7	2.10	2.36
10/24	5	3	1	-	4	2.1	199	18.4	2	238	5.3	4	1.35	1.35
	6	14	12	-	26	13.3	223	34.7	19	243	9.9	26	9.80	9.80
	7	8	8	-	16	8.2	255	38.9	7	253	9.6	16	6.90	6.90
	8	2	1	-	3	1.5	318	-	1	265	11.3	3	1.61	1.61
	9	4	1	-	5	2.6	317	40.4	4	268	10.4	5	2.68	2.68
	10	-	2	-	2	1.0	-	-	-	274	13.4	2	-	-
	11+	-	1	-	1	.5	-	-	-	268	-	1	-	-
Period total		83	72	40	195	100.0	137	81.6	103	203	34.6	195	43.26	68.78

Table 12. Kodiak test trawl caught food/bait herring AWL summaries, 1990-91.

Sample Period	Age (years)	Sex: Male	Female	Unknown	Total	Percent of Total	Weight: Mean (gm)	Std. Dev.	Number Weighed	Std. Length: Mean (mm)	Std. Dev.	Number Measured	Tons	Adj. Tons
RASPBERRY STRAITS *STATISTICAL AREA A010*														
	0	-	-	-	-	-	-	-	-	-	-	-		
	1	-	-	1	1	.6	-	-	-	156	-	1		
	2	52	53	14	119	66.1	73	15.5	57	169	10.3	119		
	3	12	21	-	33	18.3	133	20.6	22	206	13.1	33		
	4	7	4	-	11	6.1	176	21.2	9	222	6.0	11		
11/ 5	5	5	2	-	7	3.9	175	25.9	4	224	10.1	7		
	6	2	3	-	5	2.8	257	6.4	2	234	12.5	5		
	7	1	1	-	2	1.1	229	7.1	2	240	11.3	2		
	8	-	-	-	-	-	-	-	-	-	-	-		
	9	-	-	-	-	-	-	-	-	-	-	-		
	10	1	-	-	1	.6	310	-	1	264	-	1		
	11+	-	1	-	1	.6	348	-	1	266	-	1		
Period total		80	85	15	180	100.0	112	59.4	98	185	25.8	180		
KUPREANOF STRAITS *STATISTICAL AREA UG10*														
	0	-	-	-	-	-	-	-	-	-	-	-		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	52	52	6	110	94.0	76	15.1	56	176	8.3	110		
	3	6	1	-	7	6.0	119	4.0	4	200	5.8	7		
	4	-	-	-	-	-	-	-	-	-	-	-		
10/31	5	-	-	-	-	-	-	-	-	-	-	-		
	6	-	-	-	-	-	-	-	-	-	-	-		
	7	-	-	-	-	-	-	-	-	-	-	-		
	8	-	-	-	-	-	-	-	-	-	-	-		
	9	-	-	-	-	-	-	-	-	-	-	-		
	10	-	-	-	-	-	-	-	-	-	-	-		
	11+	-	-	-	-	-	-	-	-	-	-	-		
Period total		58	53	6	117	100.0	79	18.1	60	177	10.0	117		

-Continued-

Table 12. (page 2 of 5)

Sample Period	Age (years)	Sex			Total	Percent of Total	Weight			Std. Length			Tons	Adj. Tons
		Male	Female	Unknown			Mean (gm)	Std. Dev.	Number Weighed	Mean (mm)	Std. Dev.	Number Measured		
OUTER VIEKODA BAY *STATISTICAL AREA UG21*														
	0	-	-	-	-	-	-	-	-	-	-	-		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	-	-	3	3	18.8	66	11.0	3	167	11.1	3		
	3	-	-	-	-	-	-	-	-	-	-	-		
	4	-	-	-	-	-	-	-	-	-	-	-		
11/ 2	5	-	1	-	1	6.3	230	-	1	234	-	1		
	6	3	2	-	5	31.3	250	15.4	5	241	4.1	5		
	7	3	-	-	3	18.8	312	20.2	3	256	9.3	3		
	8	-	1	-	1	6.3	269	-	1	249	-	1		
	9	1	-	-	1	6.3	345	-	1	257	-	1		
	10	1	-	-	1	6.3	263	-	1	250	-	1		
	11+	-	1	-	1	6.3	321	-	1	253	-	1		
Period total		8	5	3	16	100.0	238	92.3	16	232	33.7	16		
OUTER TERROR BAY *STATISTICAL AREA UG21*														
	0	-	-	-	-	-	-	-	-	-	-	-		
	1	1	-	1	2	1.1	-	-	-	149	2.8	2		
	2	66	87	16	169	93.9	74	16.3	75	174	9.5	169		
	3	4	5	-	9	5.0	123	11.6	7	202	5.4	9		
	4	-	-	-	-	-	-	-	-	-	-	-		
11/ 3	5	-	-	-	-	-	-	-	-	-	-	-		
	6	-	-	-	-	-	-	-	-	-	-	-		
	7	-	-	-	-	-	-	-	-	-	-	-		
	8	-	-	-	-	-	-	-	-	-	-	-		
	9	-	-	-	-	-	-	-	-	-	-	-		
	10	-	-	-	-	-	-	-	-	-	-	-		
	11+	-	-	-	-	-	-	-	-	-	-	-		
Period total		71	92	17	180	100.0	78	20.9	82	175	11.4	180		

-Continued-

Table 12. (page 3 of 5)

Sample Period	Age (years)	Sex Male	Sex Female	Sex Unknown	Total	Percent of Total	Weight Mean (gm)	Weight Std. Dev.	Weight Number Weighed	Std. Length Mean (mm)	Std. Length Std. Dev.	Std. Length Number Measured	Tons	Adj. Tons
RASPBERRY STRAITS														
STATISTICAL AREA A010														
	0	1	1	-	2	1.7	203	24.7	2	240	7.1	2		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	-	1	-	1	.8	82	-	1	177	-	1		
	3	14	7	-	21	17.6	132	19.2	21	207	8.8	21		
	4	10	7	-	17	14.3	183	22.6	17	230	6.4	17		
12/ 8	5	3	4	-	7	5.9	210	23.7	7	236	8.1	7		
TOW #1	6	12	14	-	26	21.8	224	32.3	26	238	10.5	26		
	7	15	14	-	29	24.4	255	29.4	28	249	8.5	29		
	8	1	-	-	1	.8	270	-	1	245	-	1		
	9	4	3	-	7	5.9	250	63.2	7	249	20.7	7		
	10	1	2	-	3	2.5	300	23.7	3	263	8.6	3		
	11+	2	3	-	5	4.2	311	21.8	5	266	6.7	5		
Period total		63	56	-	119	100.0	214	58.5	118	236	19.5	119		
	0	-	-	15	15	5.6	7	1.3	15	87	5.2	15		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	19	12	3	34	12.8	83	14.2	28	179	8.1	34		
	3	31	37	-	68	25.6	128	26.8	55	205	9.2	68		
	4	14	21	-	35	13.2	161	20.5	26	221	9.7	35		
12/ 8	5	9	17	-	26	9.8	177	30.3	17	226	13.3	26		
TOW #2	6	22	17	-	39	14.7	210	32.7	29	235	9.4	39		
	7	21	22	-	43	16.2	237	43.1	31	245	14.1	43		
	8	-	1	-	1	.4	332	-	1	276	-	1		
	9	2	1	-	3	1.1	302	15.6	2	255	6.4	3		
	10	-	1	-	1	.4	-	-	-	259	-	1		
	11+	-	1	-	1	.4	-	-	-	282	-	1		
Period total		118	130	18	266	100.0	152	71.8	204	212	38.7	266		

-Continued-

Table 12. (page 4 of 5)

Sample Period	Age (years)	Sex Male	Sex Female	Sex Unknown	Total	Percent of Total	Weight Mean (gm)	Weight Std. Dev.	Weight Number Weighed	Std. Length Mean (mm)	Std. Length Std. Dev.	Std. Length Number Measured	Tons	Adj. Tons
RASPBERRY STRAITS (continued)														
STATISTICAL AREA A010														
	0	-	-	7	7	4.6	7	.7	7	86	2.8	7		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	1	9	1	11	7.2	84	16.1	8	184	9.4	11		
	3	15	26	-	41	26.8	135	33.1	29	208	13.5	41		
	4	11	8	-	19	12.4	175	29.1	13	220	9.9	19		
12/ 9	5	7	3	-	10	6.5	208	27.4	8	233	9.9	10		
	6	17	15	-	32	20.9	212	22.9	25	237	7.5	32		
	7	6	12	-	18	11.8	250	38.2	12	247	11.5	18		
	8	-	-	-	-	-	-	-	-	-	-	-		
	9	4	2	-	6	3.9	286	19.0	5	254	6.7	6		
	10	1	4	-	5	3.3	295	35.2	4	262	4.0	5		
	11+	3	1	-	4	2.6	312	60.8	2	258	2.8	4		
Period total		65	80	8	153	100.0	178	76.9	113	219	36.9	153		
	0	1	1	22	24	4.5	23	55.5	24	99	43.6	24		
	1	-	-	-	-	-	-	-	-	-	-	-		
	2	20	22	4	46	8.6	83	14.2	37	180	8.5	46		
	3	60	70	-	130	24.2	131	27.3	105	206	10.7	130		
	4	35	36	-	71	13.2	171	24.9	56	223	9.9	71		
All periods	5	19	24	-	43	8.0	192	31.8	32	229	12.4	43		
	6	51	46	-	97	18.0	215	30.1	80	237	9.1	97		
	7	42	48	-	90	16.7	246	37.8	71	247	12.0	90		
	8	1	1	-	2	.4	301	43.8	2	261	21.9	2		
	9	10	6	-	16	3.0	270	49.5	14	252	14.1	16		
	10	2	7	-	9	1.7	297	28.5	7	262	5.3	9		
	11+	5	5	-	10	1.9	311	30.5	7	264	8.6	10		
Total		246	266	26	538	100.0	176	74.3	435	219	36.0	538		

-Continued-

Table 12. (page 5 of 5)

Sample Period	Age (years)	Sex: Male	Sex: Female	Sex: Unknown	Total	Percent of Total	Weight: Mean (gm)	Weight: Std. Dev.	Weight: Number Weighed	Std. Length: Mean (mm)	Std. Length: Std. Dev.	Std. Length: Number Measured	Tons	Adj. Tons
TERROR BAY														
STATISTICAL AREA UG21														
	0	-	-	-	-	-	-	-	-	-	-	-		
	1	3	-	-	3	.5	42	6.7	3	146	3.0	3		
	2	217	145	26	388	69.8	77	15.1	231	175	10.6	388		
	3	71	47	-	118	21.2	130	31.2	58	202	9.0	118		
	4	8	7	-	15	2.7	170	27.6	11	217	11.0	15		
12/ 7	5	4	3	-	7	1.3	190	21.0	5	230	3.1	7		
	6	9	7	-	16	2.9	208	27.1	6	231	12.7	16		
	7	4	3	-	7	1.3	231	17.0	2	239	9.8	7		
	8	-	-	-	-	-	-	-	-	-	-	-		
	9	-	-	-	-	-	-	-	-	-	-	-		
	10	1	1	-	2	.4	-	-	-	245	1.4	2		
	11+	-	-	-	-	-	-	-	-	-	-	-		
Period total		317	213	26	556	100.0	95	39.8	316	185	20.3	556		

1991/92 Management Plans and Issues

Additional ADF&G surveys and sampling needs to be completed in order to continue to document overwintering herring concentrations. This is especially important since Kodiak's local spawning population is increasing which is complicating stock assignments (local vs. Kamishak) of harvested herring. An additional management concern is the lack of funding to provide for on the grounds monitoring of the fishery in the event there is an increase in effort levels. No changes in the harvest strategy are expected to occur for the 1991-92 season.

LITERATURE CITED

Johnson, B.A. and C. Burkey, and D. Gaudet. (Draft manuscript 1988). Stock identification of Pacific herring in the bait fishery in Shelikof Strait, Alaska, 1985/86. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

1990

KODIAK MANAGEMENT AREA

HERRING SAC-ROE HARVEST STRATEGY

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Regional Information Report[1] No. 4K90-11

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Division of Commercial Fisheries
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[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished division reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

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ABSTRACT

The 1990 Kodiak herring sac-roe fishery guideline harvest level is 2,375 tons. The season for this fishery will begin at 12:00 noon on April 15 and will close at 12:00 noon on June 30. Fishing periods will be 24 hours in duration and each will begin at 12:00 noon on odd numbered days and end at 12:00 noon on even numbered days.

The Kodiak sac-roe fishery is currently managed by the use of 57 management units which are treated as individual stocks and have a history of sac-roe harvests. Additionally there are 14 exploratory management units which potentially support sac-roe stocks and 6 management units which occur offshore and are not perceived to have habitat suitable for spawning activity to occur.

Guideline Harvest Levels (G.H.L.) are provided for each of the 57 management units as shown in Table 1 on page 10. In-season emergency order closures for each unit will occur as the G.H.L.'s for each unit are achieved. Closures may also result prior to attaining a G.H.L. if the fishery performance indicates that stock status is weaker than expected.

All in-season emergency order closures or reopenings will be broadcast on 4125 Khz by Peggy Dyson following her daily marine weather broadcasts at 8:00 a.m. and 6:00 p.m. News releases will be available both inside and outside the Kodiak ADF&G building at past locations. Additionally, the most current closure announcements will be available 24 hours/day on the ADF&G record-a-phone at 486-4559.

There are several new regulations that will be in effect for the first time during the 1990 season. These regulations are listed on page 2; A complete copy of the Kodiak Area Herring Regulations are attached to the Harvest Strategy.

All herring buyers/processors and all tenders are required to register at the Kodiak ADF&G office prior to commencing operations in the Kodiak Area. There is no special vessel registration required for fishing vessels.

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KODIAK AREA HERRING SAC-ROE FISHERY

INTRODUCTION

The Kodiak Area herring sac-roe fishery has occurred annually since 1964, a 26 year period. This fishery was an open-to-entry fishery from 1964 to 1980, and was under a moratorium-to-new-entry fishery from 1981 to 1984, and has been a limited entry fishery from 1985 to present. Effort levels during these latter years are shown in Table 2 on page 14. A listing of entry permits issued by gear type as of January 1989 is shown in Table 3 on page 15.

This fishery targets on individual herring stocks during their spawning period. The desired product is pre-spawn herring having a roe recovery percentage acceptable to industry. In recent years the average roe recovery has approximated 10% in this fishery.

During this 26 year period the average harvest has been 1,350 tons. For the eleven (11) year period from 1979-1989, when both seine and gillnet gear levels have evolved through similar regulatory adjustments, the average harvest has been 2,048 tons. The annual harvest levels during this eleven year period have oscillated closely around this average harvest (Table 2, page 14).

GENERAL HARVEST POLICY

Harvesting is intended to occur in an orderly fashion with minimal waste of the resource and within conservation limits as determined by the Alaska Department of Fish and Game (ADF&G). Consequently, ADF&G will manage the fishery per the statewide general herring policy which provides for harvesting to occur in traditional in-shore areas and at the traditional time of greatest roe recovery value, as much as possible. However, roe recovery will not be a criteria for emergency openings or closures except in cases where documented excessive wastage is, or is expected to be, a factor.

Because of the differential timing and abundance of Kodiak's various exploited herring stocks, relatively high ratio of gear levels to Guideline Harvest Levels (GHL's), and the competition between gear types for the same stocks, this fishery is best served by a fixed opening date, which is currently April 15. The season will close for each stock by emergency order as their respective guideline harvest levels are achieved or when fishery performance and stock performance indicate that deviations from the guideline harvest levels are warranted, i.e. where actual harvests occur at levels greater or lesser than expected. Stocks which are considered to be under-exploited in-season will

remain open for adequate exploitation to occur or until the regulatory closure of June 30. During the regulatory season, April 15 to June 30, stocks which have been closed to harvesting may be reopened if it is determined by ADF&G that "new" fish have increased the available spawning biomass to the point that the initial exploitation rate has dropped below 10% for that stock (See Table 1.) Any reopenings will require confirmation that the "new" fish are not juvenile herring, post spawners, or other forage fish and will require that ADF&G have the ability to monitor and regulate the reopening "on the grounds". At least 24 hours notice will be given prior to any reopenings.

REGULATORY ABSTRACT

REGULATIONS IN EFFECT:

A listing of the new regulations for 1990 are as follows:

NEW REGULATIONS FOR 1990

- 5 AAC 27.505 (c)(3)(B) and (C) are amended and (c) (3) (C) is added to read:

DESCRIPTION OF DISTRICTS AND SECTIONS (See pages 18 and 19)

(c)

(3)

(B) Inner Uyak Bay Subsection: all waters of Inner Uyak Bay south of the latitude of Carlsen Point, excluding the Larsen Bay and Browns Lagoon subsections;

(C) Browns Lagoon Subsection: that portion of the Inner Uyak Bay Section in Amook Pass south of a line from the northern tip of Amook Island to Carlsen Point and north of the latitude of the southern tip of Amook Island.

(f)

(2)

(B) East Sitkalidak Subsection: all waters of East Sitkalidak Straits and associated bays enclosed by a line from Left Cape (57°15'30" N. lat., 152°57' W. long) to Cape Barnabas (59°09' N. lat., 152°53' W. long.) and east of 153°16'24" W. long., excluding the Tanginak Anchorage Subsection;

(C) West Sitkalidak Subsection: all waters of West Sitkalidak Straits and associated bays west of 153°16'24" W. long. and north of a line from Cape

Kasiak to Natalia Point, excluding the Barling Bay Section.

Authority: AS 16.05.251

5 AAC 27.525(a) is amended to read:

5 AAC 27.525. SEINE SPECIFICATIONS AND OPERATIONS: No purse seines may be more than 1,025 meshes in depth, including meshes used as chaffing gear, or more than 100 fathoms in length.

5 AAC 27.536. SIZE LIMITS: No CFEC herring seine permit holder may sell or have aboard a vessel any herring that were taken during the herring sac-roe season if the number of individual herring per 50 pounds of net weight exceeds 250 fish.

This was a new regulation in 1989 which may need to be adhered to during the 1990 season due to the increased biomass of age 3 and age 2 herring expected to be present in the Kodiak Management Area.

- This regulation was developed by Kodiak ADF&G staff in order to provide adequate protection to any stock heavily dominated by recruit-age fish. This regulation was supported by the Kodiak Fish and Game Advisory Committee and was unanimously supported by the Alaska Board of Fisheries.

- It was recognized that this regulation was unique for the State's sac-roe fisheries, however the Kodiak sac-roe fishery itself is unique in the manner it is conducted. By allowing a free-roaming fleet to randomly harvest any of the recognized 57 stocks without 100% on-the-grounds monitoring by ADF&G, the potential negative impact on all stocks is relatively high. This is particularly true for smaller stocks heavily composed of recruit-age fish. This regulation was intended to provide biological protection for these stocks without affecting the unique nature of Kodiak's sac-roe fishery.

- All fishermen must be able to evaluate, on the grounds, before "seined-up" herring are killed, if the school of herring they've captured is comprised of large enough herring so that a weighed sample of 50 pounds is not comprised of more than 250 fish, i.e. the herring are large enough that it doesn't require 5 or more herring to yield one pound of net weight.

This can be determined through the normal process of sampling seined-up herring for adequate roe-recovery. At that time, through the use of a small scale, it can be determined if the "number per weight" requirements will be met, i.e. the number of herring comprising the catch does not exceed 250 fish per 50 pounds of net weight.

It will be illegal to possess or sell a quantity of herring which, when sampled, does not meet this minimum size limits of 250 fish per 50 pounds of net weight.

REGISTRATION REQUIREMENTS:

Tenders and Processors

The tender registration procedure requires:

- Each tender operator and processor must register either in person or may be registered by an authorized agent for that tender or processor.

- Registration must occur prior to taking fish on-board the tender or taking fish at the processing plant.

Registration will ensure that all tenders and processors know the proper reporting requirements needed by ADF&G to manage the herring sac-roe fishery.

THIS REGULATION WILL BE STRICTLY ENFORCED FOR THE 1990 SEASON!

- (See Regulation 5 AAC 27.540 of the Commercial Herring Regulations.

Fishing Vessels

There are no special registration requirements for either seine or gillnet vessels.

GUIDELINE HARVEST LEVELS:

For the 1990 sac-roe season, approximately 2,375 short tons are expected to be harvested from the entire management area. Harvest projections by management unit are listed in Table 1.
These harvest projections are the best estimates of desired harvest levels for each stock based upon ADF&G evaluation of stock status. These harvest projections are not guaranteed quotas and the actual harvest may exceed or fall short of these projections.

In-season evaluation of each stocks actual status will be guided by several criteria associated with stock performance, e.g. biomass estimates, age composition, etc! and with fishery performance, e.g. fishery timing and harvest duration, etc!

FISHING SEASON

April 15 through June 30 unless closed earlier by emergency order on a stock by stock basis.

Closures may result from desired harvest levels of each stock either being achieved or else in jeopardy of being significantly exceeded. Closures may also result when unexpected weaknesses in stock strength become apparent.

FISHING PERIODS

Initially, fishing periods will be 24 hours long. They will begin at 12:00 Noon on all odd numbered days and end at 12:00 Noon on all even numbered days. The first 24 hour fishing period will begin at 12:00 Noon on April 15.

CLOSED AREAS:

Regulatory Closures

Browns Lagoon is closed at the seaward entrance of the lagoon.

Women's Bay is closed inside of a line from Shannon's Point to Nyman's Peninsula. The latitudes and longitudes of these points are described in regulation 5 AAC 27.530.

1990 Emergency Order Closures:

All Uganik Island Lagoons will remain closed until it can be determined that specific and adequate spawning biomasses are available for harvest; see Figure 3 on page 19 for the approximate location of these closure's boundaries.

EXTRA TIME FOR GILLNETTERS

Under certain conditions, herring gillnetters are allowed a two hour grace period before having to completely remove their gear from the water. These conditions are:

1. Herring gillnets may remain in the water up to two hours after the announced "primary closure time" for

those announced fishing periods having fishing time of three hours or less.

2. Herring gillnets may remain in the water up to two hours after the announced "primary" closure time for those fishing periods greater than three hours in length, where the announcement occurs less than three hours before the scheduled "primary closure time" of the fishing period.

The "primary closure time" is the time at which all seine gear must have completed fishing. When it applies, the "secondary closure time", i.e. at the end of the two hour grace period for gillnet gear, ALL GILLNETS MUST BE COMPLETELY OUT OF THE WATER AND NO GILLNET GEAR MAY BE SET OR RESET AFTER THE "PRIMARY CLOSING TIME".

AIRPLANES:

There are no restrictions on the use of airplanes in the roe herring fishery.

IN-SEASON STRATEGY

General Discussion

As shown in Table 1, those sections where historical harvests have occurred, have been assigned guideline harvest levels. Those sections where sporadic or no harvests have occurred, have been designated "Exploratory" with no designated guideline harvest level, however in-season closures will be used to ensure that excessive harvests are minimized in exploratory situations.

The guideline harvest levels established for each section, district and/or the entire management area are meant to reflect the stock status. This means that the previous season's stock performance has been evaluated and that trends have been identified and used to influence the current season's GHL's. Specifically, these criteria are 1) 1989 expected biomass vs. actual biomass estimates, 2) average school size, 3) trends in age composition, 4) level of recruitment (age 3), 5) proportion of the spawning population age 5 and younger, 6) level of age 2 fish in the spawning biomass (indicator of future recruit strength) and 7) spawn observations (extent, frequency, amount deposited). This information is supplemented by fishery performance information, namely the expected vs. actual harvest timing, harvest duration, and harvest level.

Guideline harvest level adjustments are subsequently made based upon the aforementioned criteria. Adjustments may

vary from 0 to ± 100% of the previous season's GHL depending upon the degree remedial action is required, generally adjustments are gradual, ± 25% or ± 50%.

At any time in-season, closed area adjustments can be made when it appears that pre-season expectations were wrong. Consequently there may be sections either closed prior to reaching their GHL's or allowed to harvest in excess of their GHL's either in one opening or reopenings if the assessed available spawning biomass warrants it.

Fishing Periods

Initially, fishing periods will begin at 12:00 Noon on the odd numbered days of the month beginning on April 15 and end at 12:00 Noon on the even numbered days. Staggered days of fishing have the advantage of providing clearly defined closed periods which allow the staff time to collect, summarize, and update all harvest data from previous fishing periods; it allows for comparisons between reported and actual harvests. Since 1979, the occurrence of significant excessive harvests in this fishery have been prevented by providing these pre-established fishing periods. Towards the end of the season (usually early June) when fleet size and exploited stocks are few in number, fishing periods may be modified to provide more continuous fishing time to facilitate adequately harvesting late occurring stocks. However, ADF&G's ability to monitor this fishery becomes very limited by late May and June and this will be a major consideration in the nature of fishing period modifications.

For the 1990 sac-roe fishery, more restrictive adjustments in fishing periods are not expected to occur. However, in the event that active gear levels expand or become unexpectedly efficient to the point that a pattern of excessive harvests develop, deviations from the normal 24 hour fishing periods may be required.

E.O. Announcements: "Getting the Word"

Because the management strategy for this fishery allows for all gear to fish all open areas during the open fishing periods, there is considerable dispersion of gear throughout the season. Consequently, it is very important for the fleet to keep abreast of any changes in closures, potential short notice closures, and/or reopenings. This can be accomplished in the following ways: 1) By personal contact with the Kodiak Herring Management staff in Kodiak via office visits, telephone (either at work or at home), or radio-telephone; 2) By contact with ADF&G field personnel and the ADF&G vessel, the M/V COHO; 3) By contacting Peggy Dyson on 4125 mhs or any local herring processor and having

them transmit the latest Kodiak herring emergency order; 4) By calling the 24-hour recorded message phone at 486-4559; 5) By listening for any emergency order update which will be broadcast by Peggy Dyson following either her 8:00 A.M. or 6:00 P.M. weather broadcasts; 6) By reading or collecting the latest emergency order from the pouch posted outside the entrance to the Kodiak Fish and Game building; and 7) By listening to the Fish and Game reports broadcast over the local AM and FM radio stations (consult stations for broadcast times). No announcements will be given via VHF because of the limited broadcast range from the Kodiak office; however special consideration may be given to the Chiniak Bay fishery if the VHF base station is operational for the 1990 season.

Because of the extensive announcements associated with this fishery, it is highly recommended that fishermen document the latest E.O. announcement broadcast from Peggy Dyson by either marking a chart or making a tape recording of her broadcast. Many fishermen currently do this as do the ADF&G and F&W protection vessels.

ADF&G Field Crews/Fishermen Cooperation:

The crew on board the Department's M/V COHO and seasonal biologists in remote tent camps will aid the Area Management Biologists by making frequent fishermen contacts in order to collect data on harvest levels and rates, fleet movements, and fleet observations of herring concentrations. Fishermen cooperation will be appreciated when Department personnel request herring samples from the commercial catch; also, samples from juvenile schools inadvertently seined-up will be gladly accepted by all ADF&G personnel. These samples will be used primarily for monitoring age composition, which assists in determining the health of the stock when used with other stock performance indicators. Copies of historical age data by stock are readily available at the Kodiak ADF&G office.

ADF&G field crews will also be monitoring and mapping spawning activities, and will be soliciting information on commercial sightings to supplement information gathered by ADF&G. Fishermen and spotter pilots are encouraged to provide biomass and spawning information to ADF&G; these reports will be treated confidentially. Past cooperation has generally been excellent and has proven valuable in evaluating stock status and in gaining critical management information.

Because of concern over the occurrence of oil from the March 24, 1989 oil spill in P.W.S. affecting Kodiak fish stocks, habitat, and other wildlife, any information on oil

encountered by fishing vessels, tenders and spotter pilots should be passed along to ADF&G personnel for documentation.

In-Season Catch Reporting

With approximately 100+ limited entry permit holders expected to fish during the 1990 sac-roe season, frequent aerial surveys and timely catch reports will continue to be an important management tool, particularly in areas that are not covered by field crews. Timely and accurate catch information provided by the processors and fishermen will be essential in managing the fishery. Processors and independent tender operators will be required to provide daily tallies of herring deliveries by statistical area and must provide accurate estimates of herring onboard tenders that have not yet delivered to the cannery. Inaccurate or untimely information could result in the closure of an area. Individual code sheets will be provided for each tender or processor that is required to report catches on a daily basis by radio. Each tender operator and buyer must register with the Department prior to fishing and will be given a packet containing regulations, statistical charts, etc.

Guideline Harvest Level

The 1990 sac-roe harvest should be one of the largest on record, approximately 2,375 tons are expected to be harvested. If recruitment is above average in several major stocks or if virgin stocks are exploited, the actual harvest may well exceed the GHL. However, if recruitment is generally weak area-wide and/or adverse weather conditions prevail throughout the season the actual harvest may be significantly less than the GHL.

The listing in Table 1, "GUIDELINE HARVEST LEVELS BY MANAGEMENT UNIT" will be used as an aid in making in-season management decisions. These harvest levels are meant to reflect the status of each listed stock, however, some stocks lack the data base needed for adequate evaluation. Consequently, annual harvest levels for these stocks may fluctuate considerably until their status is more clearly understood. Again, all fishermen, pilots and processors are encouraged to provide the ADF&G management staff with any information or estimates on stock size they may accumulate either in-season or post-season.

TABLE 1
KODIAK HERRING SAC ROE FISHERY
KODIAK GUIDELINE HARVEST LEVELS BY STOCK

STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	REQUIRED SPAWNING BIOMASS @10% EXPLOITATION	@20% EXPLOITATION
	AFOGNAK DIST.			
A010	Raspberry Sts.	55 TONS	550 Tons	275 Tons
A020	Malina Bay	30 TONS	300 Tons	150 Tons
A031	Paramanof Bay	40 TONS	400 Tons	200 Tons
A032	Foul Bay	20 TONS	200 Tons	100 Tons
A040	Devils Inlet	10 TONS	100 Tons	50 Tons
A040	Blue Fox	10 TONS	100 Tons	50 Tons
A050	Offshore W. Afog.1/	-	1/	1/
A060	Shuyak Is.	20 TONS	200 Tons	100 Tons
A070	Perenosa Bay	15 TONS	150 Tons	75 Tons
A071	Delphin Bay	10 TONS	100 Tons	50 Tons
A072	Seal Bay	10 TONS	100 Tons	50 Tons
A080	Tonki Bay	15 TONS	150 Tons	75 Tons
A090	Izhut Bay	25 TONS	250 Tons	125 Tons
A091	Kitoi Bay	15 TONS	150 Tons	75 Tons
A092	MacDonalds Lagoon	10 TONS	100 Tons	50 Tons
A100	Danger Bay	30 TONS	300 Tons	150 Tons
A101	Litnik	10 TONS	100 Tons	50 Tons
A102	Duck Bay	10 TONS	100 Tons	50 Tons
District Totals	17	335 TONS	3,350 Tons	1,675 Tons

STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	REQUIRED SPAWNING BIOMASS @10% EXPLOITATION	@20% EXPLOITATION
	UGANIK DIST.			
UG10	Kupreanof	10 TONS	100 Tons	50 Tons
UG20	Viekoda	20 TONS	200 Tons	100 Tons
UG21	Terror	60 TONS	600 Tons	300 Tons
UG21	Uganik Is. Lagoon[2]	CLOSED	[2]	[2]
UG30	Village Island	25 TONS	250 Tons	125 Tons
UG31	W. Uganik Pass	15 TONS	150 Tons	75 Tons
UG32	NE Arm Uganik	75 TONS	750 Tons	375 Tons
UG33	E. Arm Uganik	30 TONS	300 Tons	150 Tons
UG34	S. Arm Uganik	30 TONS	300 Tons	150 Tons
UG40	Offshore Uganik[1]	-	[1]	[1]
District Totals	9	265 TONS	2,650 Tons	1,325 Tons
	UYAK DISTRICT			
UY10	Offshore Uyak[1]	-	[1]	[1]
UY20	Harvester Island	10 TONS	100 Tons	50 Tons
UY30	Inner Uyak	240 TONS	2,400 Tons	1,200 Tons
UY32	Browns Lagoon	20 TONS	200 Tons	100 Tons
UY31	Larsen Bay	10 TONS	100 Tons	50 Tons
UY40	Zachar Bay	100 TONS	1,000 Tons	500 Tons
UY50	Spiridon Bay	160 TONS	1,600 Tons	800 Tons
District Totals	6	540 TONS	5,400 Tons	2,700 Tons
	ALITAK DIST.			
AL10	Outer Alitak	(Exploration)	[3]	[3]
AL20	Inner Alitak	(Exploration)	[3]	[3]
AL21	Deadman Bay	125 TONS	1,250 Tons	625 Tons
AL30	Sulua/Portage Bay	60 TONS	600 Tons	300 Tons
AL40	Lower Olga/Moser[4]	15 TONS	150 Tons	75 Tons
AL40	No. Upper Olga B.[4]	10 TONS	100 Tons	50 Tons
AL50	So. Upper Olga B.[4]	190 TONS	1,900 Tons	950 Tons
AL60	Geese/Twoheaded	(Exploration)	[3]	[3]
District Totals:	7	400 TONS	4,000 Tons	2,000 Tons

STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	REQUIRED SPAWNING BIOMASS @10% EXPLOITATION	@20% EXPLOITATION
	STURGEON/HALIBUT DIST.			
SH10	Sturgeon/Halibut	(Exploration)	3/	3/
	GENERAL DISTRICT			
GO10	Kaiugnak	10 TONS	100 Tons	50 Tons
GO20	W. Sitkalidak St.	50 TONS	500 Tons	250 Tons
GO21	Barling	20 TONS	200 Tons	100 Tons
GO22	E. Sitkalidak St.	95 TONS	950 Tons	475 Tons
GO23	Tanginak Anchorage	15 TONS	150 Tons	75 Tons
GO30	Outer Sitkalidak	(Exploration)	3/	3/
GO40	Outer Kiliuda	(Exploration)	3/	3/
GO41	Inner Kiliuda	10 TONS	100 Tons	50 Tons
GO42	Shearwater	25 TONS	250 Tons	125 Tons
GO50	Pasagshak	25 TONS	250 Tons	125 Tons
GO50	Outer Ugak	(Exploration)	3/	3/
GO51	Inner Ugak	50 TONS	500 Tons	250 Tons
GO60	Womens Bay	110 TONS	1,100 Tons	550 Tons
GO70	Monashka/Mill B.	(Exploration)	3/	3/
GO80	Anton Larsen	20 TONS	200 Tons	100 Tons
GO81	Sheratin	10 TONS	100 Tons	50 Tons
GO90	Kizhuyak	110 TONS	1,100 Tons	550 Tons
G100	Kalsin Bay	15 TONS	150 Tons	75 Tons
G101	Middle Bay	20 TONS	200 Tons	100 Tons
G102	Inshore Chiniak	10 TONS	100 Tons	50 Tons
G103	Spruce Island	10 TONS	100 Tons	50 Tons
District Total	20	605 TONS	6,050 Tons	3,025 Tons
	MAINLAND DIST.			
M010	North Mainland	(Exploration)	3/	3/
M020	Inner Kukak	50 TONS	500 Tons	250 Tons
M030	Outer Kukak1/	-	1/	1/
M040	Inner Missak	(Exploration)	3/	3/
MO40	Outer Missak1/	-	1/	1/
M050	Inner Katmai	50 TONS	500 Tons	250 Tons

STAT. AREA	MGMT. UNITS	1990 GUIDELINE HARVEST LEVEL	REQUIRED SPAWNING BIOMASS @10% EXPLOITATION	@20% EXPLOITATION
	MAINLAND DISTRICT (Continued)			
M060	Outer Katmai[1/]	-	[1/]	[1/]
M070	Alinchak	30 TONS	300 Tons	150 Tons
M080	Puale Bay	(Exploration)	[3/]	[3/]
M090	Portage Bay	(Exploration)	[3/]	[3/]
M100	Outer Portage[1/]	-	[1/]	[1/]
M110	Wide Bay	100 TONS	1,000 Tons	500 Tons
M120	Lower Shelikof	(Exploration)	[3/]	[3/]
District Total		230 TONS	2,300 Tons	1,150 Tons
GRAND TOTAL		2,375 TONS	23,750 Tons	11,875 Tons

[1/] These are offshore management units which are not expected to yield herring of sac-roe quality. These units are more applicable to the food/bait fishery. (See Herring Food/Bait Fishery Management Plan.)

[2/] The Uganik Lagoon Unit refers to all lagoons on Uganik Island. Spawning biomasses associated with these lagoons appear to have been reduced to less than 50 tons, thus all waters of the lagoons located on Uganik Island will be closed to commercial herring fishing effective at 12:00 Noon April 15, 1990.

[3/] Adequate biomass to justify an "exploratory" harvest; the actual harvest should not exceed 20% of the available biomass.

[4/] The following management units have been modified either in name or boundaries for the purpose of in-season management of the Olga/Moser Bay herring stocks. Each unit will be described by emergency order when closures are issued for these units.

- AL40 Lower Olga/Moser Unit: Formerly that portion of the Olga/Moser Bay Section south of the latitude of Stockholm Point.
- AL50 North Upper Olga Unit: Formerly that portion of the Olga/Moser Bay Section north of the latitude of Stockholm Point.
- AL50 South Upper Olga Unit: Formerly called the Upper Olga Bay Section.

TABLE 2.

KODIAK HERRING SAC-ROE FISHERY

FISHERY SUMMARY BY YEAR AND BY GEAR

YEAR	SEASON LENGTH DAYS	TOTAL HARVEST	BY GEAR		PERCENT		LANDINGS		NO. UNITS		AVG. $'S	
			SEINE	G/N	SEINE	G/N	SEINE	G/N	SEINE	G/N	SEINE	G/N
1979	36	1735	1457	278	84	16	-	-	57	125	38,347	3,333
1980	35	2383	2009	374	84	16	-	-	92	109	14,978	2,573
1981	48	2065	1596	469	77	23	207	406	79	114	14,402	3,471
1982	59	1771	1447	324	82	18	138	191	45	67	17,819	2,719
1983	51	2319	1797	522	78	22	164	284	41	64	35,061	6,520
1984	54	2163	1691	472	78	22	138	212	39	69	34,691	5,457
1985	59	1968	1244	724	63	37	118	348	34	81	32,935	8,039
1986	61	1558	1110	448	71	29	132	385	31	71	34,010	6,002
1987	61	2146	1591	554	74	26	122	411	29	62	54,872	8945
1988	59	2171	1304	867	60	40	169	555	33	76	51350	14837
1989	76	2249	1513	736	67	33	171	627	37	83	34749	7537
11 YEAR AVG.	55	2048	1524	524	74	26	151	380	47	84	29313	5639

TABLE 3.
STATUS OF KODIAK SAC ROE HERRING PERMITS

	1987	1988	1989
G.N. TRANSFERABLE	59	63	64
G.N. NON-TRANSFERABLE	48	41	41
G.N. TOTAL	107	104	105
G.N. FISHED	62	76	83
SEINE TRANSFERABLE	40	45	45
SEINE NON-TRANSFERABLE	26	24	24
SEINE TOTAL	66	69	69
SEINE FISHED	29	33	37
TOTALS			
TRANSFERABLE	99	108	109
NON-TRANSFERABLE	74	65	65
TOTAL	173	173	174
FISHED	91	109	120

Table 4.

1990

HERRING SAC-ROE SEASON

ALASKA DEPARTMENT OF FISH AND GAME

KODIAK AREA MANAGEMENT STAFF

Area Management Biologist	Asst. Area Management Biologist
Larry Malloy	Dave Prokopowich

Fishery Biologists

Kevin Brennan
Joan Brodie

M/V Coho Crew	Herring Field Crew Personnel		Aircraft Pilots
Tom Emerson	Kim Rudge	Ed Sampson	Hal Terry
Dennis Gretsch	Leslie Scott	John Becker	Larry Nicholson
	Deb Robinson	Bruce McIntosh	
	Mo Lambdin	Ed Hajdys	

REGIONAL SUPERVISOR: Larry Nicholson

REGIONAL FINFISH COORDINATOR Pete Probasco

TABLE 5.

STATEWIDE PROJECTED HERRING HARVEST FOR 1990 BY MANAGEMENT AREA[1/]

	1989		1990					
	Opening or First			Exploi-tation	Mean Wt.	Spawning	Stock Status	
Stock/Fishery	Harvest	Harvest	Harvest	Rate	(g)	Biomass	Level	Trend
Southeastern								
Kah Shakes	3/20	592	0			3,300	Depressed	Declining
Sitka	3/3>	12,135	4,150	15.0%	118	27,000	Moderate	Declining
Seymour Canal	4/28	547	312	10.2%		3,150	Depressed	Declining
Lynn Canal	Closed due to low stock abundance						Depressed	Stable
Yoonah Snd. Pound			1[a]			4,000	High	
Food and Bait	1/01	3,400	3,400				Moderate	Stable
Prince Wm. Sound								
Seine	Closed due to oil		6,038					
Gill Net	Closed due to oil		353					
Pound Kelp	Closed due to oil		118[a]					
Wild Kelp	Closed due to oil		104[a]					
Food and Bait	11/01	656	1,696[b]					
Total			10,392[c]	20.1%[d]	142	51,692[d]	High[d]	Stable[d]
Lower Cook Inlet								
Eastern and Outer Districts	Closed due to oil		700					
Southern District	4/20	171	175					
Kamishak District	4/20	4,800	2,292	10.0%[e]	201	28,653	High	Stable
Upper Cook Inlet								
Sac Roe	4/22	172	80			Unknown	Depressed	Increasing
Food and Bait	4/30	45	50			Unknown	Depressed	Increasing
Kodiak								
Sac Roe	4/15	2,249	2,100		200		Moderate	Stable
Food and Bait								
Eastern Shelikof	8/01	327	573					
Other Kodiak	8/01	13	278		200	Unknown	Moderate	Stable
Chignik Sac Roe	4/15	66	65			Unknown		
Alaska Peninsula								
Port Moller	5/28	745	375		220	2,500	Moderate	stable
South Peninsula	5/13	310	400		250	Unknown	Moderate	stable
Dutch Harbor								
Food and Bait	7/16	3,101	679					
Bristol Bay (Togiak)								
Seine	5/12	9,413	6,769					
Gill Net	5/09	2,843	2,256					
Spawn on Kelp	5/14	280[a]	175[a]					
Total		16,857[f]	11,204[f]	20.0%	361	56,020	Moderate	Declining
Kuskokwim Area								
Security Cove	5/17	554	235	15.0%		1,560	Moderate	Declining
Goodnews Bay	5/23	616	350	15.0%		2,330	Moderate	
Cape Avinof	6/04	129	300	15.0%		2,020		
Nunivak Island	5/22	116	[g]	15.0%		320		Declining
Nelson Island	5/28	233	[g]	10.0%		2,050		Declining
Cape Romanzof	5/26	926	360	15.0%		2,410		Declining
Norton Sound								
Gill Net	5/27	4,381						
Beach Seine	5/27	390						
Total		4,771	3,300	20.0%		16,320	Moderate	Stable
Port Clarence	No Harvest		165					
Sac Roe Harvest Total:[h]		41,387	30,775					
Food and Bait Harvest Total:		7,542	6,674					
Total Herring Harvest:		48,929	37,449					

[a] Harvest of spawn-on-kelp product in short tons.

[b] Preliminary 1989 food/bait guideline. The 1990 guideline will be set after 1990 sac-roe season.

[c] Includes mortality allowances of 1,532 and 863 tons for pound and wild spawn on kelp fisheries.

[d] Preliminary forecast pending evaluation of Exxon Valdez oil spill impacts. Subject to revision.

[e] Kamishak District exploitation rate includes the eastern Shelikof food and bait harvests.

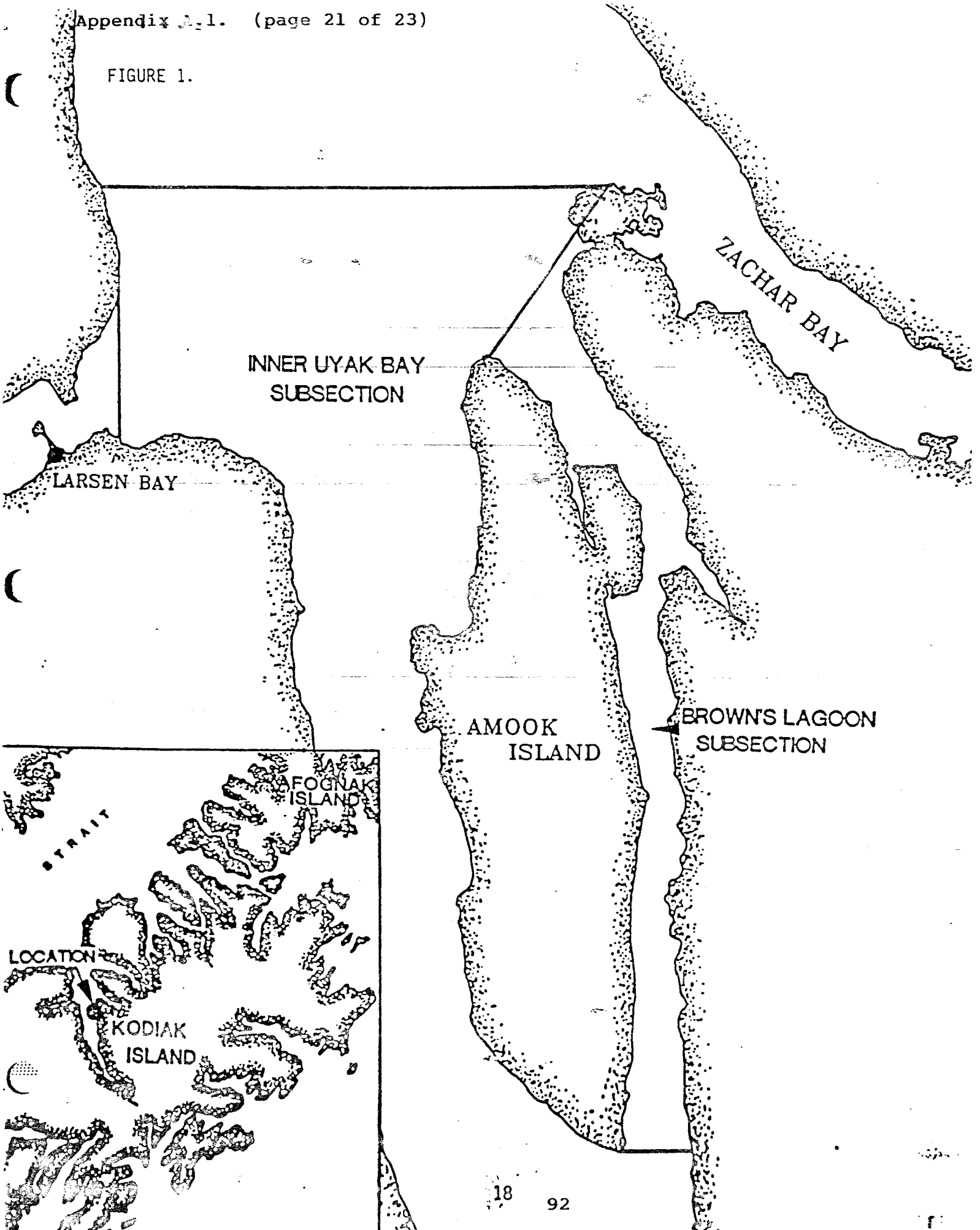
[f] Togiak total harvest includes an allowance for 1,500 tons mortality for the spawn-on-kelp fishery.

[g] Projected biomass below minimum for commercial harvest; fishery will be opened if threshold biomass observe

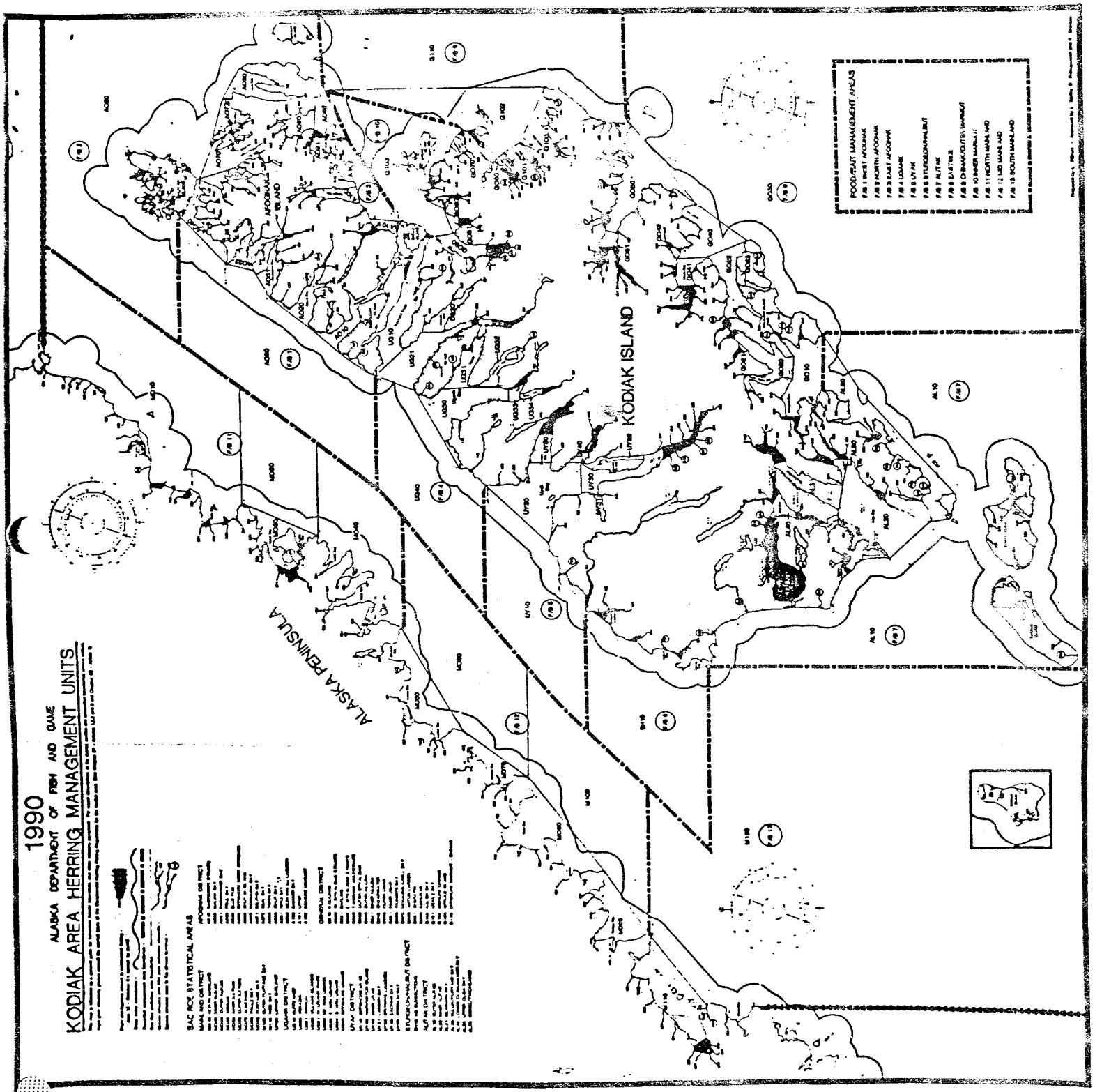
[h] Sac roe statewide total harvests do not include allowances for spawn-on-kelp fishery mortality.

[1/]The projected 1990 harvest for the Kodiak Area is 2,375 s.t.; the 2,100 s.t. shown in this table was a preliminary figure and as of March has been finalized at 2,375 s.t.

FIGURE 1.


ZACHAR BAY
INNER UYAK BAY
SUBSECTION
LARSEN BAY
AMOOK
ISLAND
BROWN'S LAGOON
SUBSECTION
AFOGNAK
ISLAND
STRAIT
LOCATION
KODIAK
ISLAND

Appendix A.1. (page 22 of 23)
FIGURE 2.


1990
ALASKA DEPARTMENT OF FISH AND GAME
KODIAK AREA HERRING MANAGEMENT UNITS
KODIAK ISLAND
ALASKA PENINSULA
FOOD FISH MANAGEMENT AREAS

1990/91

HARVEST STRATEGY FOR THE KODIAK MANAGEMENT AREA

COMMERCIAL FOOD/BAIT HERRING FISHERY

By:

Dave Prokopowich
Kevin Brennan
and
Dennis Gretsch

Regional Information Report[1] No 4K90-23

Alaska Department of Fish and Game
Division of Commercial Fisheries
211 Mission Road
Kodiak, Alaska 99615

August, 1990

[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

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INTRODUCTION

- This harvest strategy attempts to answer most pertinent pre-season and in-season questions regarding the Kodiak food/bait herring fishery.

- This fishery targets both Kodiak and Kamishak spawning stocks which are present in the Kodiak Area during the food/bait season (8/1 - 2/28).

- Since the herring sac-roe fisheries in the Kodiak and Cook Inlet areas are closed-to-entry fisheries, they are treated as primary fisheries and are managed to provide for the majority of the harvest on the affected stocks to occur in these fisheries. The food/bait fisheries on these same stocks are subsequently treated as secondary fisheries and associated harvest levels are directly related to the results of the sac-roe fisheries on these stocks; food/bait harvest levels generally will not exceed 10% of the sac-roe harvest on any of these stocks. Consequently, consideration is given to the biological concerns associated with "double dipping" fisheries on the same stock and is also given to the 200+ limited entry permit holders for both Kodiak and Cook Inlet sac-roe fisheries whose economic interests in permits could be adversely affected without a specific allocative directive for each fishery.

- Since the commercial sac-roe fisheries in Kodiak and Cook Inlet target on herring with mature roe beginning with age 4 and primarily on age 5 and older herring; individual food/bait landings of age 3 or less will be adjusted to reflect weights of age 5 herring.

- A Board of Fisheries regulatory change in March 1988 resulted in the directive to manage the Kodiak Area food/bait fishery in a manner which considers the aforementioned concerns. Specifically management is guided by the following new regulation:

  5 AAC 27.535

  a) The department shall manage the herring food/bait fishery, (directed on Kodiak spawning stocks) so that the food/bait harvest does not exceed 10% of the actual herring harvest in the previous season.

  b) The department shall manage the herring food/bait fishery that is directed on Kamishak spawning stocks, which over-winter in the Eastern Shelikof Straits, so that the food/bait harvest does not exceed 2% (two) of the total available spawning biomass of Kamishak stocks as determined by the department during the most recent Kamishak herring sac-roe season.

1. SEASON:

   - August 1, 1990 through February 28, 1991.

2. FISHING PERIODS:

   - Open to continuous fishing from 12:01 A.M. 8/1/90 to 12:00 P.M. 2/28/91 unless superceded by emergency order closures.

3. CLOSED WATERS:

   - See CLOSED WATERS section of the 1990 Commercial Herring Regulation book (page 36), 5 AAC 27.530

   - Consult 1990 Commercial Salmon Fishing Regulations for listing of closed waters for the period August 1 through October 31.

4. PERMITS REQUIRED (2):

   A. Interim Use Permits for legal gear:

      - H01K Purse Seine
      - H34K Gillnet
      - H07K Trawl

   B. Registration Permit - Kodiak ADF&G Office

      - Permit will be used for:

         - Monitoring fleet size by gear type.

         - Clarifying catch reporting procedures, closed water areas, and in-season emergency order announcement procedures.

   - Both permits are available at the Kodiak Fish and Game office.

5. LEGAL GEAR RESTRICTIONS:

   01 - Purse Seines
      - Maximum length: 100 fathoms
      - Maximum depth: 1,000 meshes (herring web)
      - Leads allowed during food/bait season.

   34 - Gillnets
      - Maximum length: 150 fathoms; mesh size: 2-1/8" - 2-1/2".

   07 - Trawl
      - No restrictions

   - Consult the 1990 Herring Regulation book for a complete listing of all regulations.

6. HARVEST STRATEGY:

Regulation 5 AAC 27.535(a)(b), as approved by the Alaska Board of Fisheries in March 1988, describes a harvest strategy for the Kodiak Area food/bait fishery which provides for:

- A secondary food/bait harvest, following a primary sac-roe harvest, on both Kodiak spawning stocks and on Kamishak spawning stocks which occur in the Kodiak Management Area during the Kodiak food/bait season (8/1 - 2/28).

- An exclusion of a food/bait harvest on Kodiak stocks in that portion of Shelikof Straits associated with the occurrence of Kamishak stocks as depicted in Fig. 1, except that a harvest on Kodiak stocks may occur in the aforementioned units if the harvest occurs in in-shore areas (bays) prior to a closure of these areas based upon the G.H.L. for Kamishak stocks being achieved.

- An exploratory harvest scenario on unidentified stocks which occur in areas not covered by the two aforementioned provisions.

To accommodate this harvest strategy, thirteen (13) food/bait management units have been established to include geographical groupings of sac-roe stocks and adjacent offshore areas (See Fig. 2).

- For each management unit there is a Guideline Harvest Level (G.H.L.) which reflects the combined G.H.L.'s for Kodiak stocks included within each food/bait unit (See Table 1).

- Six of these food/bait units have also been identified and consolidated into a geographical grouping representing that area where the food/bait harvest on Kamishak stocks will most likely occur (See Fig. 1).

The 1990 food/bait G.H.L. for the Kodiak Area will be affected by the following management considerations:

- <u>For Kodiak spawning stocks</u>, the department will generally limit the food/bait harvest to 10% of the previous spring's sac-roe harvest on a stock by stock basis. Variations to this strategy are depicted in Table 1 with explanations listed in the Table's footnotes. Harvest levels on Kodiak stocks in the adjacent offshore areas will reflect the combined food/bait G.H.L. for the sac-roe stocks included within that management unit. See Table 1 for a listing of G.H.L.'s by stock and by management unit.

- <u>For identified non-Kodiak spawning stocks</u>, the department will control the harvest to insure that a particular stock is not overexploited. At this time, Kamishak Bay spawning stock(s) are the only identified non-Kodiak spawning stock(s) which occur in the Kodiak Management Area during the Kodiak food/bait season (8/1 - 2/28).

    - In the case of Kamishak Bay spawning stock(s) where evidence exists that they are present in Kodiak area waters during the food/bait season, the harvest level will not be allowed to exceed 196 tons. This tonnage is approximately 1% of the 1990 Kamishak Bay pre-sac-roe season total available indexed spawning biomass (sac-roe harvest: 2,264 s.t. plus post-season indexed spawning biomass 17,286 s.t.)

- Management of Kamishak stocks for both the sac-roe and food/bait fisheries is outlined in Table 2.

- During the food/bait fishery, the Department will attempt to identify the location of Kamishak stock(s) in Kodiak Area waters via data collected from the commercial fishery and/or the ADF&G vessel M/V Resolution during its hydroacoustical surveys which target Shelikof Straits herring biomasses; the M/V Coho may also be required to assist in this search.

  - All herring samples obtained from either source will be expeditiously worked-up to apply A-W-L comparisons between Kodiak and Kamishak stocks.

  - Biomass estimates will be obtained from the fishery in terms of verbal estimation via skipper interviews as to stocks, distribution, average school size, estimated number of schools, etc! Biomass estimates will also be obtained acoustically from the M/V Resolution surveys.

- Herring harvested in this fishery from the following management units will be identified as either Kodiak stocks (per regulation 5 AAC 535(2) or as Kamishak stock(s).

- These units include F/B 1, F/B 2, F/B 4, F/B 5, F/B 11 and F/B 12 as as depicted in Figure 1.

- Herring harvested from the aforementioned food/bait management units, where the harvest occurred in in-shore (bays) locations, will be considered to be Kodiak stocks unless A-W-L and/or biomass data indicates otherwise, in which case they will be considered to be Kamishak stocks.

  - If the harvest ceiling of 196 tons on Kamishak stocks is achieved, all of the aforementioned management units would be closed to herring fishing for the remainder of the food/bait season.

- <u>For non identified herring stocks</u> which may occur in off-shore locations in the remaining food and bait management units, the department will control the harvest to insure that a particular stock is not overexploited. Actual harvest levels may be determined by harvest location, biomass observed and age-weight-length information.

7. <u>GUIDELINE HARVEST LEVELS</u>:

- For the 1990/91 food/bait season the following harvest levels will be in effect:

  - <u>For Kodiak spawning stocks:</u> Per regulation 5 AAC 27.535(a) as described under "Harvest Strategy", a maximum of 280.4 tons properly distributed by stock through- out the management area will be the food/bait harvest on Kodiak spawning stocks.
    - See Table 1 for harvest projections by stock.

  - <u>For Kamishak spawning stocks:</u> Per regulation 5 AAC 27.535(b) as described under "Harvest Strategy", a maximum of 196 tons harvested from that portion of Shelikof Straits depicted in Figure 1 (see attached) will be the food/bait harvest ceiling on Kamishak spawning stocks which occur in the Kodiak Area during the food/bait season (8/1 - 2/28).

- Prior to harvesting Kamishak stocks in the aforementioned area, a harvest on Kodiak stocks may occur per regulation 5 AAC 27.535(a).

  - Herring harvested in inshore (bays) locations will be considered to be Kodiak stocks unless A-W-L sampling and/or biomass information indicates otherwise, in which case they will be considered to be Kamishak stocks.

- **For unidentified stocks:** No guideline harvest levels are established, however the remaining 524 tons of the regulatory 1,000 ton G.H.L. cited in the 1990 commercial herring regulation book would be expected to occur on these stocks, if justified by stock(s) strength.

  - Harvest levels per geographically distinct biomasses will be established in-season per information obtained from A-W-L sampling and from "skipper" interviews detailing estimates of biomass strength, seasonal distribution, school size, etc.

8. REPORTS REQUIRED BY FISHERMEN:

- All landings of herring for food/bait purposes must be verbally reported to ADF&G before the product is totally unloaded at the dock.

  - The following phone numbers will reach Fish and Game personnel 24 hours per day:

    - ADF&G Office: Monday through Friday
      8:00 A.M. to 4:30 P.M. - 486-4791

    - After Office Hours:
      4:30 P.M. to 8:00 A.M. - 486-6007 (Dave Prokopowich)
      - 486-6475 (Kevin Brennan)
      - 486-4831 (Pete Probasco)

All fish tickets must be completed and sent in to the Kodiak Fish and Game office within a week of the landing.

- Send to: Alaska Department of Fish and Game
  211 Mission Road
  Kodiak, Alaska 99615

Table 1. KODIAK MANAGEMENT AREA
1990/91 HERRING FOOD/BAIT HARVEST STRATEGY
A LISTING OF GUIDELINE HARVEST LEVELS BY FOOD/BAIT MANAGEMENT UNITS[1/]

Food/Bait Mgmt. Units	Sac-Roe Management Units No.	Name	1990 Sac-Roe G.H.L.	1990 Sac-Roe Harvest	1990/91 Food/Bait G.H.L.
F/B 1	A010	Raspberry	55.0	41.9	5.5
	A020	Malina	30.0	37.6	3.0[2/]
West Afognak	A031	Paramanof	40.0	41.9	4.0[2/]
Unit	A032	Foul Bay	20.0	21.3	2.0
	A040	Blue Fox	10.0	0.0	1.0
	A050	Offshore Afognak	-	0.0	[6/]
UNIT TOTALS:			155.0	142.7	15.5
F/B 2	A060	Shuyak	20.0	0.0	2.0[4/]
	A070	Perenosa	15.0	29.3	1.5
North Afognak	A071	Delphin	10.0	0.0	1.0
Unit	A072	Seal Bay	10.0	0.0	1.0[5/]
	A080	Tonki	15.0	7.2	1.5[2/]
UNIT TOTALS:			70.0	36.5	7.0
F/B 3	A090	Izhut	25.0	29.2	2.9
	A091	Kitoi	15.0	8.9	1.5
East Afognak	A092	McDonalds	10.0	0.2	1.0
Unit	A100	Danger	30.0	5.3	3.0
	A101	Litnik	10.0	3.4	1.0
	A102	Inshore Marmot	10.0	0.0	10.0[4/]
UNIT TOTALS:			100.0	47.0	19.4
F/B 4	UG10	Kupreanof	10.0	0.0	10.0[4/]
	UG20	Viekoda	20.0	27.7	2.0
Uganik	UG21	Terror	60.0	14.8	6.0
Unit	UG30	Village Islands	25.0	58.3	5.8
	UG31	W. Uganik Passage	15.0	22.3	2.2
	UG32	N.E. Arm Uganik	75.0	46.3	7.5
	UG33	E. Arm Uganik	30.0	41.2	4.1
	UG34	S. Arm Uganik	30.0	51.8	5.2
	UG40	Offshore Uganik	-	0.0	[6/]
UNIT TOTALS:			265.0	262.4	42.8

Table 1. (continued)

Food/Bait Mgmt. Units	Sac-Roe Management Units No.	Name	1990 Sac-Roe G.H.L.	Harvest	1990/91 Food/Bait G.H.L.
F/B 5	UY10	Offshore Uyak	-	0.0	[6/]
	UY20	Harvester	10.0	0.0	1.0[4/]
Uyak	UY30	Inner Uyak	240.0	242.9	24.0
Unit	UY32	Browns Lagoon	20.0	22.5	2.0
	UY31	Larsen Bay	10.0	7.2	1.0
	UY40	Zachar	100.0	95.5	10.0
	UY50	Spiridon	160.0	177.4	16.0
UNIT TOTALS:			540.0	545.5	54.0
F/B 6 Sturgeon/ Halibut Unit	SH01	Sturgeon/Halibut	Exploration	0.0	Exploration
UNIT TOTALS:				0.0	-
F/B 7	AL10	Outer Alitak	-	0.0	
	AL20	Inner Alitak	Exploration	0.0	Exploration
Alitak	AL21	Deadman	125.0	143.5	12.5
Unit	AL30	Sulua	60.0	81.3	6.0
	AL40	Lower Olga/Moser	25.0	0.0	2.5
	AL50	Upper Olga/Moser	190.0	184.4	19.0
	AL60	Geese/Twoheaded	Exploration	0.0	Exploration
UNIT TOTALS:			400.0	409.2	40.0
F/B 8	G010	Kaiugnak	10.0	0.0	1.0
	GO20	W. Sitkalidak	Exploration	55.9	Exploration
Eastside	GO21	Barling	20.0	23.2	2.0
Unit	GO22	E. Sitkinak	95.0	126.7	12.73[3/]
	GO23	Tanginak	15.0	28.1	1.5[5/]
	GO30	Outer Sitkalidak	Exploration	0.0	-
	GO40	Outer Kiliuda	Exploration	22.3	Exploration
	GO41	Inner Kiliuda	10.0	8.1	1.0
	GO42	Shearwater	25.0	92.0	2.5
	GO50	Outer Ugak	Exploration	0.0	Exploration
	GO50	Pasagshak	25.0	68.6	2.5
	G051	Inner Ugak	50.0	101.9	5.0
UNIT TOTALS:			250.0	526.8	28.2

Table 1. (continued)

Food/Bait Mgmt. Units	Sac-Roe Management Units No.	Name	1990 Sac-Roe G.H.L.	Harvest	1990/91 Food/Bait G.H.L.
F/B 9	G060	Womens Bay	110.0	74.8	11.0
	G100	Kalsin Bay	20.0	11.8	2.0
Chiniak	G101	Middle Bay	25.0	16.1	2.5
Unit	G102	Inshore Chiniak	10.0	0.0	10.0[4/]
UNIT TOTALS:			165.0	102.7	25.5
F/B 10	G070	Monashka/Mill Bay	Exploration	0.0	Exploration
	GO80	Anton Larsen	30.0	7.4	3.0
North Kodiak	GO81	Sheratin	10.0	1.3	1.0
Unit	G090	Kizhuyak	110.0	101.7	11.0
	G103	Spruce Island	10.0	0.0	10.0[4/]
UNIT TOTALS:			160.0	110.4	25.0
F/B 11	M010	North Mainland	Exploration	0.0	Exploration
	M020	Inner Kukak	50.0	75.5	5.0
North Mainland	M030	Outer Kukak	-	0.0	Exploration
Unit	M040	Missak	Exploration	0.0	Exploration
UNIT TOTALS:			50.0	75.5	5.0
F/B 12	M050	Inner Katmai	50.0	0.0	5.0
	M060	Outer Katmai	-	0.0	Exploration
Mid-Mainland	M070	Alinchak	30.0	41.2	3.0
Unit	M080	Puale Bay	Exploration	0.0	Exploration
	M090	Portage Bay	Exploration	0.0	Exploration
UNIT TOTALS:			80.0	41.2	8.0
F/B 13	M100	Outer Portage	-	0.0	Exploration
South Mainland	M110	Wide Bay	100.0	47.1	10.0[5/]
Unit	M120	Lower Shelikof	-	0.0	Exploration
UNIT TOTALS:			100.0	47.1	10.0
GRAND TOTALS:			2,415.0	2,346.9	280.4

*See footnotes on next page.

FOOTNOTES:

[1/]The Kodiak Area total G.H.L. for food/bait, as indicated in the 1990 Herring Regulation book is 1,000 s.t. However, as indicated under the regulatory harvest strategy, these stocks exploited during the sac-roe season are managed to retain approximately 10% of the available harvest for the food/bait fishery. This table reflects the available food/bait harvest for each sac-roe stock or food/bait unit, whichever applies. (See Harvest Strategy.)

[2/]Sac-roe management units where excessive sac-roe harvests may have occurred either this year or in the past and where a reduced food/bait harvest is justified.

[3/]Sac-roe management units where the sac-roe harvest substantially exceeded pre-season expectations probably as a result of increased stock abundance rather than overharvest and where an increased food/bait harvest commensurate with the increased sac-roe fishery is justified.

[4/]Sac-roe management units where a sac-roe underharvest may have occurred and where an increased food/bait harvest is justified. In some cases where the stock status is in question the increased food/bait harvest may still be less than pre-season expectations on those stocks.

[5/]Sac-roe management units where the sac-roe harvest was substantially less than pre-season expectations probably as a result of an overestimation of stock strength and where a reduced food/bait harvest is justified.

[6/]See attached plan for management of the Kamishak Bay Herring Spawning Stocks in the Shelikof Straits Food and Bait Fishery.

Table 2.

MANAGEMENT OF THE KAMISHAK BAY HERRING SPAWNING STOCKS
IN THE SHELIKOF STRAIT
FOOD AND BAIT FISHERY

Addendum to the 1988 Kamishak Bay
Herring Management Plan

Kamishak Bay herring spawning stocks support both the Kamishak Bay sac-roe fishery and the Shelikof Strait food and bait fishery. Pursuant to the Board of Fisheries decision to allocate 2% of the Kamishak Bay herring spawning biomass to the Shelikof Strait food and bait fishery, the following adjustments will be made to the 1988 Kamishak Bay sac-roe fishery management plan to accommodate the Board's actions and to protect the Kamishak Bay herring stock from over harvest:

1) ADF&G guidelines direct that herring harvest rates be kept at or below 20% of the current best estimate of biomass, depending upon stock strength and age composition. Best estimates of biomass of the Kamishak Bay herring stock are currently determined by aerial survey following the spring sac-roe fishery. Therefore, harvest levels in the Shelikof Strait food and bait fishery will be based on this estimate of spawning biomass.

2) The harvest ceiling for the Shelikof Strait food and bait fishery will be 2% of the best estimate of the total Kamishak biomass, as determined by the Department during the most recent Kamishak herring sac-roe season. The total Kamishak Bay biomass will be determined by the best estimate of the spawning biomass following the sac-roe fishery plus the total harvest from the sac-roe fishery.

3) Present management strategy for the Kamishak Bay spawning stocks attempts to achieve a maximum harvest rate on older fish of 20% while keeping the harvest rate of fish age 5 and younger at or below 10%.

4) If ADF&G determines the harvest rate for the stock of Kamishak Bay herring should be less than 20%, either due to a decrease in biomass, weak year classes, or poor recruitment, the 2% food and bait harvest ceiling will be reduced proportionally. [i.e. If the biological markers (decrease in biomass, weak year classes, or poor recruitment) indicate that the sac-roe harvest needs to be reduced, for example to 15%, the food and bait fishery would be reduced to 1.5%]

5) If the spawning biomass of the Kamishak Bay herring stocks falls below the biological threshold level of 8,000 tons, both the Kamishak Bay sac-roe and the Shelikof Strait food and bait fishery will be closed or severely limited.

6) The allocation of herring to the Shelikof Strait food and bait fishery is based on spawning biomass, primarily age 5 and older herring,not on the biomass of juveniles. Therefore, the quantity of Kamishak Bay stocks ages 4 and younger caught in Shelikof Strait will be adjusted upward to bring the biomass of these younger age classes up to the biomass of age 5 herring.

Appendix B.1. (page 13 of 14)

Fig. 1. Geographical Area encompassed by management plan for the Shelikof Straits food/bait fishery.

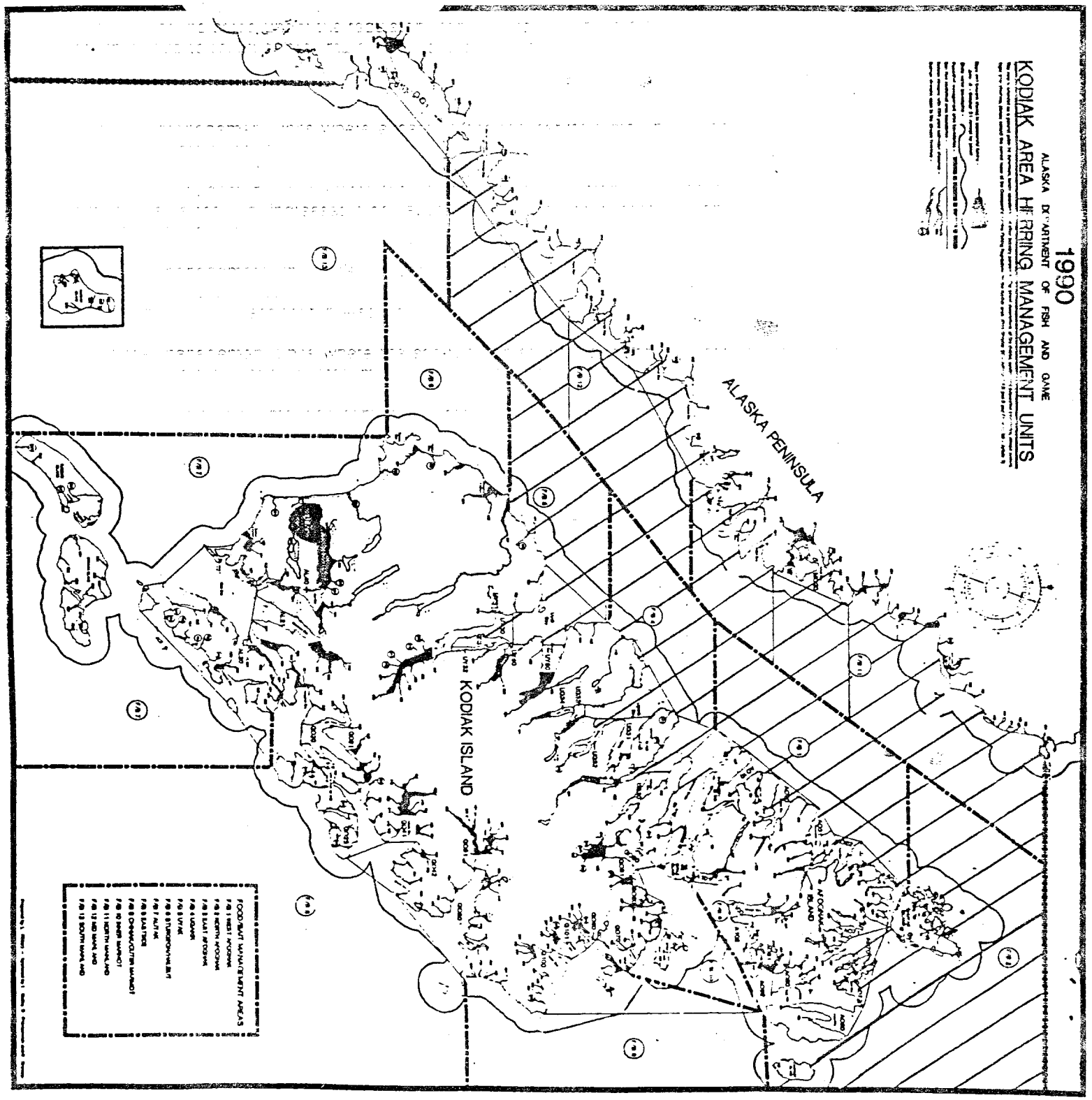

Fig. 2. 1990/91 Statistical chart for the Kodiak food/bait fishery.